THE HEATING AND VENTILATING MAGAZINE

1123 BROADWAY NEW YORK JULY, 1906

# NATIONAL ASSOCIATION OF MASTER STEAM AND HOT WATER FITTERS

WHO HELPS ME I HELP

## *Proceedings of Eighteenth Annual Convention, Atlantic City, N. J., June 20-23, 1906*

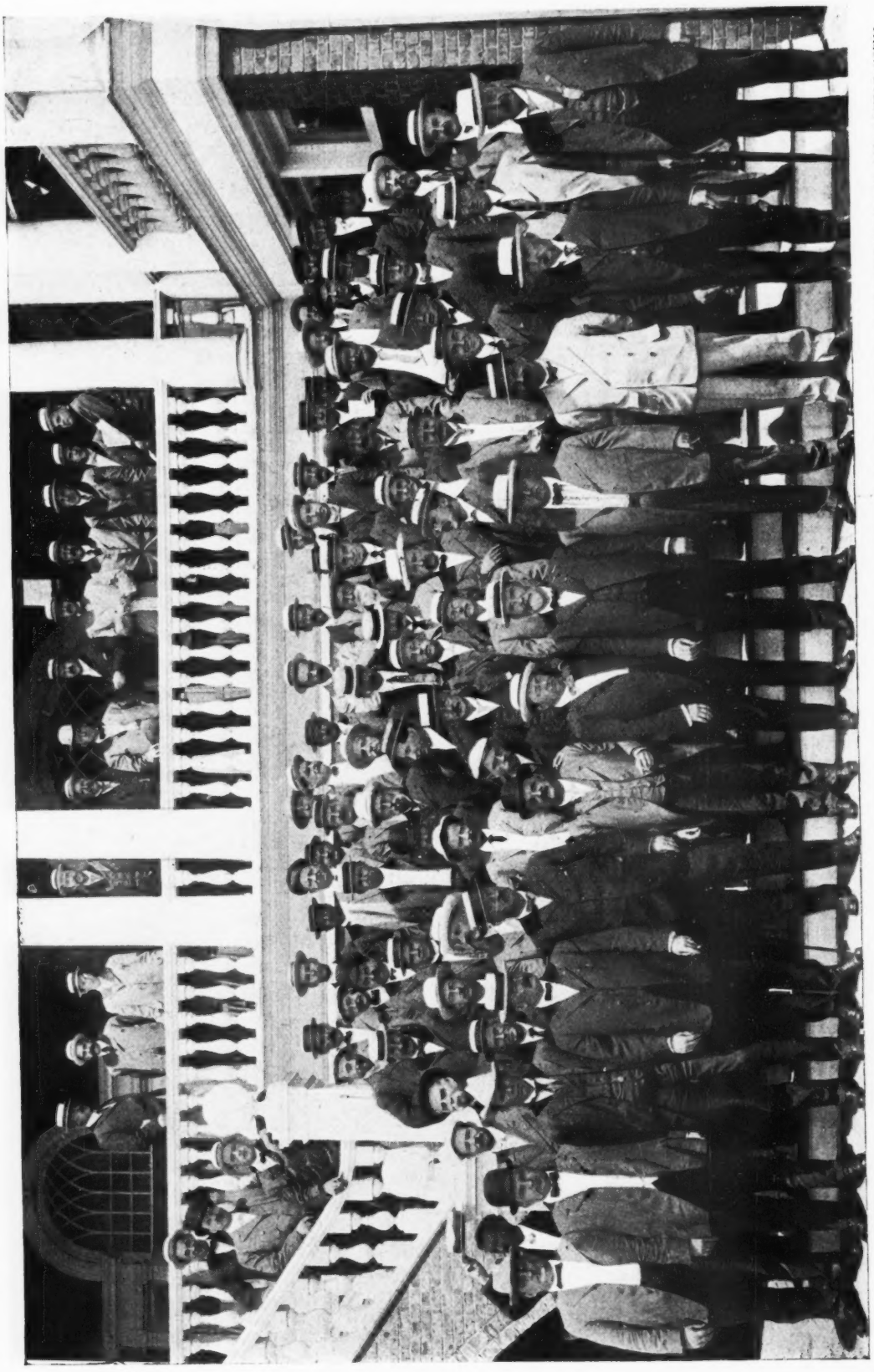
Under ideal weather conditions, and with an attendance that far outranked that of previous years, the eighteenth annual convention of the National Association of Master Steam and Hot Water Fitters was held successfully at Atlantic City, June 20–23 last. In addition to the new members present, many faces of old members were noticed who have not often been seen at the annual conventions. This was attributed, in part, to the fact that the National Association of Master Plumbers held its convention the succeeding week, and, as a number of the delegates were interested in both organizations, those who could do so came down early and attended them both. As the headquarters of the two associations were in adjoining hotels, the Master Fitters at the St. Charles and the Master Plumbers at the Rudolph, this plan proved a most convenient one.

Much of the work of the convention centered around the report of the Trade Relations Committee, telling of its dealings during the past year in an effort to improve the status of association members with the manufacturers, and in the report of the Standardization Committee which is working for better standards in piping and fittings. Included in the latter committee's report was a table of dimensions and weights for goods now used by many manufacturers in the steamfitting trade which was presented for purposes of comparison. The committee came in for much praise for the business-like manner in which the subject had been approached, and upon the able preliminary work that had been done. The committee was continued and will devote the ensuing year along the lines already followed, so that by the time of the next convention, it is anticipated that a definite schedule can be presented for adoption.

### OPENING SESSION

The opening session was held Thursday morning, June 21, after sessions the previous evening, of the Board of Directors and the Trade Relations and Standardization Committees. Seated on the platform, beside President Gormly, was Mayor Franklin B. Stoy, of Atlantic City. Others who were present at this or subsequent sessions included the following:

Charles A. Geoghegan, New York.
A. N. Chambers, New York.
William J. Baldwin, Jr., New York.
Henry L. Hall, New York.
A. E. Kenrick, Brookline, Mass.
John C. F. Trachsel, Philadelphiia.
James A. Healy, Indianapolis.
John T. Sadler, Elmira, N. Y.
George H. Zellers, Washington, D. C.
Edward B. Denny, Newark, N. J.
Henry B. Gombers, New York.
William A. Davis, New York.
Stewart A. Jellett, Philadelphia.
John T. Bradley, St. Louis, Mo.
Arthur C. Walworth, Boston, Mass.
Burton P. Hall, New York.
E. M. Nichols, Philadelphia.
A. R. Hesske.
M. G. Sellers, Philadelphia.
E. D. Smith, New York.
George T. Coppins, Boston, Mass.
Enoch Rutzler, New York.
Walter Higgins, Washington, D. C.
E. J. Ryan, Danville, Ill.
William M. Mackay, New York.
C. M. Stokes, Norristown, Pa.
E. J. Febrey, Washington, D. C.
Van Buren Giffin, Atlantic City, N. J.
Samuel Billson, Washington, D. C.
John P. Gallivan, Boston, Mass.
Otto Wurm, Detroit, Mich.
Robert Ernst, Detroit, Mich.
Angus B. Weaver, Buffalo, N. Y.
Edward Joy, Syracuse, N. Y.
T. B. Cryer, Newark, N. J.



MEMBERS AND GUESTS OF THE NATIONAL MASTER STEAM FITTERS' ASSOCIATION PRESENT AT THE RECENT CONVENTION IN ATLANTIC CITY

A. S. Armagnac, New York.
G. Petersen, New York.
W. W. Biggs, Washington, D. C.
H. L. Anness, New York.
John R. Flynn, Johnstown, Pa.
Richard Hankin, New York.
N. P. Bishop, New Haven, Conn.
L. H. Norton, Boston, Mass.
James J. Brogan, Philadelphia.
H. Hitchcock, Atlantic, Ga.
Mark E. Monash, New York.
B. Loughran, Kingston, N. Y.
P. A. Canfield, Kingston, N. Y.
W. H. McCuen, Washington, D. C.
W. M. Whitlock, New York.
H. B. Marshall, New York.
E. D. Hornbrook, Kansas City, Mo.
C. H. Deane, Detroit, Mich.
H. K. Kriebel, Philadelphia.
John Lucas, Philadelphia.
E. N. Cokefair, New York.
Francis P. Hale, Philadelphia.
C. C. Pyke, Lafayette, Ind.
Henry G. Issertel, New York.
A. C. Werkhoff, Lafayette, Ind.
Thomas Kewley, Toledo, Ohio.
P. F. McGinn, Pittsburg, Pa.
Thomas Cayan, Washington, D. C.
Thomas Eagan, Washington, D. C.
Charles Morrison, Boston, Mass.
W. P. Thompson, Philadelphia.
Thomas F. Cushing, New York.
N. C. Brizse, Pittsburg, Pa.
James J. Lawler, New York.
Harry S. Martin, Dunkirk, N. Y.
W. S. Appleton, New York.
M. E. Danforth, Washington, D. C.
H. H. Hellerman, Philadelphia.
George W. Barr, Philadelphia.
A. A. Ainsworth, Chicago, Ill.
Raymond Kinnear, New York.
L. H. Quackenboss, New York.
C. E. Hodges, Utica, N. Y.
J. O'Meara, New York.
F. C. Eckfeldt, Philadelphia.
H. D. Carter, New York.
Joseph A. Graham, New York.
E. R. Soleau, Newark, N. J.
Harry Geiser, Newark, N. J.
M. C. Honeywell, Wabash, Ind.
F. H. Falls, Rochester, N. Y.
J. A. Naylor, Baltimore, Md.
Homer Addams, Allentown, Pa.
E. F. Glore, Philadelphia.
Frank Dobson, New York.
Lew Moore, New York.
U. G. Scollay, Brooklyn, N. Y.
George D. Hoffman, Chicago, Ill.
J. B. Bernhard, Garwood, N. J.
J. D. Stiles, Boston, Mass.
J. C. Faulkner, New York.
James A. Donnelly, New York.
Warren Webster, Camden, N. J.
John K. Allen, Chicago, Ill.
Elmer Crawford, Chicago, Ill.
W. DeForest Winslow, Chicago, Ill.
F. R. Austin, New York.
C. H. Tower, New York.
W. A. S. Clarke, New York.
George H. Morris, New York.
W. G. LeCompte, Baltimore, Md.
William R. Waters, New York.
J. J. Blackmore, New York.
Herbert A. Joslin, New York.
P. M. Beecher, Syracuse, New York.
E. C. Molby, New York.
V. H. Seward, New York.
Frank J. Corbett, New York.
E. H. Roberts, New York.
C. N. Brizse, New York.
Fred W. Schultz, New York.
E. H. Fisher.
C. A. Bridgman, Philadelphia.
G. M. Bridgman, Philadelphia.
B. H. Carpenter, Wilkes-Barre, Pa.
E. P. Allen, Chicago, Ill.
Frank K. Chew, New York.
Edward J. O'Brien, Brooklyn, N. Y.
B. A. Bridge, New York.
W. G. Hawes, New York.
Wallace C. Cosgrove, Jersey City, N. J.
A. S. Moppett, Philadelphia.
Fred B. Browning, Winchester, Mass.
E. S. Storm, New York.
A. A. Schaefer, Meyerstown, Pa.
James H. Davis, Chicago, Ill.
George E. Downe, Chicago, Ill.
H. I. Lord, Chicago, Ill.
Edmund B. Keane, New York.
Charles E. Lawrence, New York
George C. Boose, Philadelphia.
Robert K. Story, New York.
John H. Waters, Johnstown, Pa.
T. Howell Johnson, New York.
L. G. McCrum, New York.
Howard T. Gates, New York.
W. H. Smith, New York.
F. A. Brandow, New York.
E. E. Fox, New York.
F. B. Miller, Westfield, Mass.
R. Reed, Westfield, Mass.
Harry Logan, Philadelphia.
Thomas Martin, New York.
M B. Moore, New York.
W. E. Jacobus, Philadelphia.
W. C. Marsh, Dunkirk, N. Y.
N. E. Gould, Dunkirk, N. Y.
A. L. DeVoe, New York.
Wiltsie F. Wolfe, Philadelphia, Pa.
R. C. Albertson, Atlantic, City, N. J.
F. W. Herendeen, Geneva, N. Y.
J. J. McKenna, Philadelphia.
George E. Walton, New York.
Howard Hovey, Reading, Pa.
W. S. Newkirk, Reading, Pa.
C. E. Smack, Cleveland, Ohio.
Charles S. Wood, New York.
Nelson S. Wood, New York.
J. B. Colladay, Philadelphia.
L. P. Monash, New York.
George Walton, Philadelphia.
Charles H. Hobson, New York.
Harding Benedict, New York.
T. Munroe Dobbins, Camden, N. J.
Arthur F. Sawyer, Philadelphia.
Fred B. Mueller, Decatur, Ill.
William F. McCarthy, Decatur, Ill.
John N. Peoples, Chicago, Ill.
W. J. Jones, Utica, N. Y.
C. W. Rainear Philadelphia.
Thomas C. Taylor, Philadelphia.
Earl M. Messinger, Philadelphia.
S. S. Brewer, Chicago, Ill.

After President Gormly had welcomed the delegates, Mayor Stoy was introduced, who extended a welcome on behalf of Atlantic City. The President then read his address which received the close attention of those present. It was expected that President Gormly would strike a new keynote in view of the developments of the past year, which have marked an epoch in the history of the association, and this expectation was borne out in his address which is presented herewith in full.

**President Gormly's Address**

Gentlemen of the Convention:

On me devolves the duty and honor to welcome you to the Eighteenth Annual Convention of the National Association of Master Steam and Hot Water Fitters.

You meet again to renew your loyalty to the principles on which the association was founded, and which have safely guided its destinies for the past seventeen years. Your laws declare these principles to be (in part) fostering of the trade and commerce in which you are engaged, to reform abuses, to secure freedom from unjust exactions, to protect against certain labor contingencies, and generally to conserve and advance the business of Steam and Hot Water Fitting.

After twelve months of separation you meet again to receive from your officers an account of their stewardship. You meet again to greet old friends, to renew old friendships, and to extend the right hand of fellowship to the members who have more recently joined your ranks, to cultivate and preserve the social feature of your annual gatherings, to compare and discuss methods in the management of your local associations, and to benefit generally by a better knowledge of each other and of the business conditions of your trade throughout the country.

The opportunity for mutual advancement is here. It is your privilege to embrace and improve it. There is no class distinction between members of this body; each is interested in the others welfare; each is willing to impart his share for the general good and anxious to receive for himself and those he represents, all the advantages that must accrue from harmonious organization.

These are the motives and characteristics that have directed and controlled your association from its inception. They have attracted and retained within its fold men noted for their business ability and sterling character. To-day its reputation for equity and fairness in the adjustment or prevention of trade encroachments is recognized by the manufacturer with whom it has dealings, and the general trade as well. No stronger proof of this is needed than the remarkable increase of membership which has taken place within the past two years. This acquisition in numbers and character being largely due to the means you have employed to carry the doctrine of unity to those who were waiting and willing to receive and adopt it. The details of this part of your work will be fully set forth in the report of your board of directors.

LARGE INCREASE IN MEMBERSHIP

It may, however, be said in passing, that you have doubled your membership in less than two years. One of the most pleasing and welcome features of this increase in membership is the return of many of your former members, who again renew their allegiance to the principles that bind you, and who stand ready to prove their loyalty, when occasion requires.

This fact will suggest to you, as it has to me, the importance of so directing legislation at this convention that your now augmented membership may be made to feel, and realize, in greater measure than ever before the advantages that come from national affiliation. The seed of organization has been well and judiciously planted, it now becomes your duty to so nurture, guard and protect the work that has been done, that the harvest shall justify and reward your labors.

LOCAL ASSOCIATIONS SHOULD BE VISITED REGULARLY BY A NATIONAL REPRESENTATIVE

This supervision and care may be exercised and directed through many channels, as it ever has been, but as an additional proof of the untiring interest of the national association in its members everywhere throughout the thirty-one states of the Union in which it is represented, I would advise that it be made the duty of an official from the national office to visit or keep in perfect and systematic touch or contact with every local association in the country; to learn and be familiar with the difficulties that arise from time to time; to have the ability and diplomacy necessary in order to counsel wisely, or, at least, to so inform your executive officers that they may be in a position to promptly act for your best interests. In other words, you must now regard your organization as a large business enterprise, represented by many branch establishments in the form of state and local associations. These to be efficient and successful must operate in harmony with each other and with your national rules. Harmonious action and greatest efficiency can only be attained through perfect mastery or detail by your executive department. In this way and by such means may each local association be kept in perfect touch with the best work of all the others, radical or hasty action on the part of any local association may be prevented, and the broad and the conservative spirit of your national association be sustained and preserved.

There may be, and doubtless are, local associations so ably governed, or wisely controlled, that supervision from the na-

EDWARD B. DENNY, NEWARK, N. J.

JOHN F. BUERKEL, BOSTON, MASS.

**New Elected Directors of the National Association of Master Steam and Hot Water Fitters**

tional association is scarcely necessary; nevertheless, I believe an occasional visit even to those may have a useful effect. Remember that no man, or no set of men, "knows it all."

The very fact that we are here assembled for interchange of thought would seem to suggest to us that better means for intercommunication is required. I know of no means so powerful to impress our members with the importance of individual loyalty, or to teach local association officers the necessity for discipline in the management of their associations, than a timely visit from a national representative, one who is sincere in his work, impressed with its importance, and familiar with prevailing conditions throughout the country. Your widely scattered members know, of course, they are links in a great national chain; they are strands in a great cable; they are aware of the necessity for, and the meaning of, your List in Accord; they know that lack of loyalty is dishonorable, and that it is for the best interests of all that unity of action be maintained; but, like many other important things that men know, they are neglected, or conveniently forgotten, and they need to be constantly reminded of them.

### A PLEA FOR LOYALTY

Reform is the watchword of the hour. It is simply an awakening of the people to the fact, that while they slumbered in fancied security, relaxing that eternal vigilance which they knew to be the price of liberty, their confidence had been abused by those in whom they trusted; their rights had been encroached upon, and their substance squandered. The reaction is now taking place, and we call it reform.

It is plain, however, that blame for all this lies with the people themselves; a spring can rise no higher than its source. The average office holder or representative, whether he be of the nation, the state, the municipality, or the corporation, but reflects the average moral stamina of his constituency. Therefore self-reform is the first essential to success; apply it to yourselves, be consistent in it, and you will, at least, command respect. Familiarize yourselves with your rules with reference to purchases, and observe them. If you violate your own laws in this regard, can you logically ask others to obey and respect them?

"To thine own self be true, and it must follow as the night the day, thou canst not then be false to any man."

Having realized the necessity for individual reform in these matters it must result in a healthier condition in your local affairs. It will bring about better fraternal relations, dispel jealousy and distrust. Each will see clearly that it is to the disadvantage and discredit of all; that one, having many of the qualifications for success, should fail from perhaps lack of knowledge of business methods, or from the need of some plain system by which the important details of his business would be always at hand, and by which he could follow the course of any contract from start to finish, and know its status at any time.

### LACK OF SYSTEM IN BUSINESS

The lack of system in business has caused more failures and loss than most of us realize. Many of those engaged in

our business have devoted all their time and energies to the mechanical perfection of their product; they can tell you to a fraction what will be the mechanical effect from a given cause; they can figure out, proportion and install a plant for heating or power and the results will scarcely vary from those they intended to reach, but they fail to turn their ability into commercial value for themselves. They often have system for everything except that which is most important—their business.

If the loss and inconvenience could be confined to themselves no one would complain, but they become the reckless bidders, and not only make no money for themselves, but prevent others from making it.

The knowledge that a competitor has a contract at a loss, is cause for regret, rather than satisfaction. If you have in your local association a man such as I have described, save him from himself. Impart to him the knowledge you have, and he has not; "show him the light." If he has the proper spirit he will appreciate your kindness; you will make of him a fairer competitor and a better business man.

By such practical work, you will vitalize your associations with a spirit of alertness, with a living, active principle that must and will guard, protect and defend your local interests.

IMPORTANCE OF STATE ASSOCIATIONS

The next important matter for your consideration must be thorough organization of state associations for the protection of isolated members as well as of those already organized. This need not be an expensive proposition nor is it a difficult one. It needs, however, a definite plan of action, a set of governing rules, few in number but clear, concise, equitable and conservative; these to be broadly stated by the national association and expressive of its policy. These general rules to be the framework or foundation for all state or local rules of government. They may be modified, enlarged or curtailed to suit the environment or best serve the interests of the members under a given jurisdiction, but before adoption, state laws must secure the approval of your national board of directors, whose duty it will be to prevent radical action, and to preserve, and firmly maintain the conservative character of your national body.

State associations should demand fair treatment from the manufacturer or jobber. The nature of these demands should be fully understood by all who are in interest. Violations will then be deliberate, and must be promptly, fully and clearly reported by the aggrieved member to the secretary of the state association, who should at once lay the matter before a committee or board appointed or elected for the purpose, whose duty it will be to hear both sides and take such action as the case requires; notice of such action being placed in the hands of every member of the state association and in the national office within twenty-four hours.

As in every other business matter, promptness is the essence of success. You will receive only the measure of protection you deserve, and you deserve only that measure that you can enforce.

Motives of policy, not sentiment, are the controlling influences in business, and they guide the actions of the manufacturer and jobber no less than other business men. Demonstrate to them by your unity, your sound business methods, your loyalty to principle, that the policy of selling direct or by subterfuge to the consumer is not the best policy, and there will soon be no room for controversy between them and yourselves. Your custom, if of greatest value, will be cultivated, your unquestioned rights will be respected, and this respect will be none the less because you have the power to enforce it.

ASSOCIATION NOW HAS POWER OF NUMBERS

Your power is now greatly enhanced, you have in great part the organization ready to your hand. Have you the desire, the willingness and the courage to defend and safeguard your interests? If so, then let your legislation here be such that when you meet again, you will present an unbroken front throughout the country wherever your trade is of importance. This is not a new theory; it is the policy of the founders of the association, but never until now have you been in a position to put it into practical operation.

SUGGESTIONS FOR DEALING WITH LABOR

Another matter that needs careful and conservative attention from you is that of labor. It is a subject so broad in its character, so varied in its effects, so influenced by former practice and present environment, that a detailed treatment of it by me is out of the question at this time, but it is of vital importance; it is the most valuable commodity that enters into your finished product. As a national body you have exerted a powerful influence for good on the commercial and the mechanical conditions that prevail in your business to-day; you have in great measure corrected trade abuses and selfish or unbusinesslike practices; wholly prevented many contemplated unjust exactions; but this most important part of your business has, so far as national work is concerned, escaped your attention.

Each local association has been allowed to meet conditions as they happened to present themselves. If trouble occurred, they usually fought the battle unaided and unadvised so far as the national office was concerned. This condition should not continue another hour after your attention has been called to it. In no better way can you convince your members of your sincerity than by extending to them a helping hand in their hour of need.

Even advice and encouragement, if nothing else, is an improvement over the work of the past. It is not so much whether or not union labor shall be employed—that is purely a local question, and this is not the time or place to discuss it, and no general plan may be devised in the absence of complete information on the subject. This should be readily supplied through co-operation between the various locals and a committee from this body acting with them.

NATIONAL OFFICE SHOULD HAVE RECORD OF WAGE AND LABOR CONDITIONS

A complete record of wage and labor conditions embracing every important city and town in the country should be on file in the national office, accessible to every member. This feature, of itself, would be invaluable to contractors, other features will suggest themselves in this connection that may prove alike beneficial to all concerned.

I have refrained from commenting, at this time, on the work of the several committees having charge of special association matters. The reports of these committees, together with reports of other officers, will be heard in executive session. They will give an idea of the extent and importance of the work accomplished during the past year. They refer to matters of vital interest to you, and should command your closest attention. They will not only serve as a guide to your deliberations, but may form a basis of your business policy for the year to come.

President Gormly's address was received with hearty applause.

The reading of the roll call and minutes were dispensed with, and a committee of credentials appointed to go over the roll and report at the next session. The president appointed as this committee, Alfred E. Kenrick, Brookline, Mass., John Gormly, Philadelphia; Samuel Billson, Washington, D. C.; M. H. Towhey, Atlantic City, N. J.; and E. J. Ryan, Danville, Ill. This committee reported at the afternoon session to the effect that 453 members of the association were entitled to seats at the convention.

The convention then went into executive session when the report of the Board of Directors was presented by Chairman Henry L. Hall.

## Report of Board of Directors

The report of the Board of Directors was, in part, as follows:

The national board of directors, elected at the Atlantic City Convention in June 1906, held its first meeting at Hotel St. Charles, Atlantic City, N. J., June 14, 1906, and organized by electing Henry L. Hall of New York city, chairman, and re-electing Henry B. Gombers secretary of the association.

The board of directors appointed as a sub-committee the chairman, the treasurer and any other director who might be present at any regular meeting. The sub-committee, as in previous years, was authorized to pass upon and decide all matters that did not require the attention of the full membership of the board.

ADMINISTRATION

By virtue of the authority vested in your sub-committee of the board of directors, the mass of details that accumulated in the interim of the monthly meetings was promptly handled.

Our headquarters have been open at all times, except Sundays and holidays.

Questions of moment requiring careful thought, were, as a rule, submitted to the absent members in writing after having been discussed at a regular meeting of the board of directors, and a decision passed to the minutes based on the consensus of opinion.

We have endeavored at all times to conscientiously observe the requirements of the constitution and to interpret broadly for the good of the body at large.

The chairman of the board of directors, the president, the vice-president and the treasurer have been in close touch with headquarters at all times. The proceedings of the board have been conducted with unanimous good will, and each director has been always actuated by motives for the good of our association.

MEMBERSHIP

The organization is to be congratulated on the splendid results that have been obtained through the efforts of our official organizer, Mr. William A. Davis.

From May 1, 1905, to May 1, 1906, we have added to our membership roll 170 members. The new membership is distributed as follows:

Alabama, 6; Connecticut, 3; Illinois, 3; Indiana, 12; Iowa, 12; Kansas, 2; Louisiana, 1; Michigan, 15; Minnesota, 8; Missouri, 14; New Jersey, 15; New York, 24; North Carolina, 1; Ohio 15 and Pennsylvania, 39.

New local associations have been formed during the year, and a determined effort is being made to develop and maintain strong state associations.

FINANCES

The treasurer's report will present in detail the condition of our treasury at the present time, and we feel sure that these various items will satisfy every member of the association.

The directors at the last convention were authorized to use all or any part of the defense fund for the purpose of organization, and can again report that we have not touched this fund and congratulate the association that the fund is larger than it was one year ago.

TRADE RESOLUTIONS AND LIST IN ACCORD

Your board of directors has been called upon to render decisions that serve to measure the strength of the List in Accord, and, as in past years, the subject has required conscientious effort.

Each meeting of the board finds applications for a place on our List in Accord, and, if we act in that spirit of fairness that characterizes "a square deal," we are obliged to tell any applicant whether we believe it to be to his advantage to place him on the list or not to do so.

We have felt that we had a duty to perform towards the firms on this List in Accord that laid upon us a moral obligation that is equal with that we owe to our membership.

We have spent hours discussing cases that seemed to involve precedents that were of sufficient value to establish. We have played no favorites, and have tried to legislate with a national spirit.

TRADE RELATIONS

The Committee on Trade Relations, through its chairman, Mr. S. A. Jellett, will present a report that will be very interesting, and your board of directors will not anticipate any part of it. We direct your very earnest attention to this report, that is the result of monumental labor and almost endless detail.

COMMITTEE ON STANDARDIZATION

This committee, composed of Messrs. Walworth, Nichols and Burton P. Hall, will present their report during the sessions.

The directors' report closed with a reference to the death of Mr. James Curran, of New York, which occurred October 28, 1905, and a copy of the resolutions presented at that time respecting Mr. Curran's services to the association was incorporated in the report.

The treasurer's report was also presented at this session.

## Treasurer's Report

The treasurer's report showed an increase in the receipts for the year over those of the previous year, although there was also an increase in expenditures. There was cash on hand May 1, 1905, $4,409.57; receipts, May 1, 1905, to May 1, 1906, $13,570.20; making a total of $17,979.77; expended, May 1, 1905, to May 1, 1906, $14,536.66. Balance on hand May 1, 1906, $3,443.11.

At the Friday morning session, President Gormly appointed a nominating committee, composed of George H. Morris, New York, Chairman; Paul H. Kendricken, of Boston; John T. Bradley, of St. Louis; A. E. Werkhoff, of Indiana and Warren Biggs, of Washington, D. C.

Following the appointment of this committee, William M. Mackay, secretary of the American Society of Heating and Ventilating Engineers, was introduced to say a few words regarding the society and its coming meeting in Chicago, July 19 and 20. Mr. Mackay said:

"I thank you for this opportunity of expressing the good will of the society to the association, though it was hardly necessary, as so many present are members of both organizations. We have in a large measure honored the same men, for of the thirteen presidents of the society seven have been members of your association. Our society includes commercial, contracting and technical engineers and specialists, working together for the advancement of the science. Its meetings are all open to all men, with the privileges of the floor to its guests, and the best thoughts and the best engineering practice are given and described freely for the common good of all. At the present time our society also enjoys having a presiding officer from Philadelphia, John Gormly, the brother of your president. By the provisions of our charter all our annual meetings are held in New York, but our semi-annual meetings are held at different points, wherever the members desire. We have been gradually working westward, and held a very interesting meeting last July in Chicago. We have again accepted the invitation of Chicago, and in behalf of the society I cordially invite the members of your association to join us in the enjoyment of our next Chicago meeting, to be held Thursday and Friday, July 19 and 20. In addition to an interesting meeting our Chicago members have some entertainment which adds to the pleasure of their guests. I hope many of you will come and bring your ladies, as they are specially invited by the Chicago committee."

The election of officers was announced at the open session, at 5 o'clock Friday afternoon, with ex-President E. D. Smith in the chair. The following ticket was elected:

ELECTED OFFICERS

President, P. Gormly, Philadelphia, Pa. (re-elected).

Vice-President, Charles A. Geoghegan, New York (re-elected).

Treasures, William J. Baldwin, New York.

Sergeant-at-Arms, John C. F. Trachsel, Philadelphia, Pa. (re-elected).

Directors, *James A. Healy, Indianapolis; *John T. Sadler, Elmira, N. Y.; *George H. Zellers, Washington, D. C.; John F. Buerkel, Boston, Mass.; Edward B. Denny, Newark, N. J.

George H. Morris and Paul H. Kendricken were appointed a committee to conduct the re-elected president to the platform, where he was greeted by the chairman, Mr. Smith. President Gormly acknowledged this appreciation of the honor conferred in his re-election and besought the continued support of members in the important undertakings planned for the ensuing year. The other officers were then installed.

On motion of George H. Morris, votes of thanks were given to Alfred E. Kenrick for twelve years of service and to Henry L. Hall, for eight years of service on the Board of Directors. The retiring treasurer, Albert

* Re-elected.

N. Chambers, was also given a vote of thanks for his long service in that capacity. On motion of Enoch Rutzler, of New York, the other customery votes of thanks were made, whereupon the convention adjourned *sine die*.

Immediately ajter the convention, the new Board of Directors organized by electing Charles A. Geoghegan chairman, Henry B. Gombers was re-elecetd secretary of the association and William A. Davis, special representative.

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# The Schoolhouse—Its Heating and Ventilation

By Joseph A. Moore,

Inspector of Public Buildings, State of Massachusetts

## Air Supply for School Rooms (Continued)

## IV

*(This Series of Articles Commenced in Our April, 1906, Number)*

The power of an aspirating chimney or vent flue to remove a given quantity of air from a room depends upon its area or cross section, its height, the difference between the external and internal temperature, the resistance or friction, and also the admission into the room of a sufficient quantity of air to replace that removed by the aspirating shaft.

The suction caused by a strong wind blowing across the top of the chimney is another important factor, but on account of its uncertainty is seldom taken into account in theoretical calculations.

To increase the velocity of the flow of air through an aspirating chimney or flue we must either increase the height of the chimney or raise the temperature within the flue.

As increasing the height of the chimney has the same effect as increasing the temperature in the flue, we see the advantage of having the chimney as high as practicable. The increased height costs nothing after the chimney is built, while the increase in heat is a constant expense.

In school buildings, for architectural reasons the aspirating chimney should not be too high, consequently we raise the temperature of the air in the chimney by means of heat applied there, or when a mechanical (fan) system of ventilation is used the air is forced out by means of a fan. Air expands about 1/490 of its volume for each degree of increase in its temperature, and, consequently, decreases in weight per cubic foot as its temperature is raised.

The heated column of air in the chimney, being lighter than a column of external air of the same area and height, rises, being forced up by the greater weight of the external air.

To find the theoretical velocity in feet per second of air in a ventilating chimney:

Let $t$=temperature of the external air; $t_1$=temperature of the air within the chimney; T=absolute* temperature of the external air; H=height of chimney in feet, and V=velocity in feet per second;

$$\text{Then } V=8.02\sqrt{\frac{H\ (t_1-t)}{T}}$$

By multiplying the value of V by 60 we have the theoretical velocity in feet per minute.

The theoretical velocity cannot be obtained in actual practice, and a deduction of from 30 to 50 per cent. (for roughly built and crooked flues even more) should be made from the theoretical velocity for friction and eddies.

Neglect to make sufficient allowance for friction in ducts and aspirating chimneys has been the cause of partial failure in many an otherwise well-arranged scheme of ventilation.

Care should be taken that an aspirating chimney is not too large or too small.

In the small chimney the friction may be the cause of failure, and in one too large, eddies will contribute to the same result.

By standing in the bottom of an abnormally large aspirating chimney

*Absolute temperature=460 degrees below zero.

and throwing into the different parts of the chimney thistle-down or coma of the milk-weed, the action of the eddies can easily be seen by watching the movement of these light substances.

### SEPARATE VENT DUCTS FROM EACH ROOM

It is better to provide a separate vent duct from each room than to enter the vents from several rooms into one large aspirating chimney, as the outflow of air from the several rooms can be more easily and equally regulated where separate vents ducts are provided.

The amount of heat required for each flue and the position of the damper can then be regulated to meet the special requirements of each room, especially when there is a strong wind.

At one time a very common method of heating an aspirating chimney or flue was by placing the smoke-pipe from the furnace in the center of the chimney, a cast-iron pipe being sometimes used; occasionally one made of drain-tile. When we consider the low temperature at which the products of combustion should enter such a pipe from a well-designed furnace, and the fact that the smoke-pipe was placed in the most effective and best part of the vent shaft, as well as the large increase in friction, it may well be doubted whether much was gained by this process.

Furthermore, such a pipe was of no use in mild weather, when there was no fire in the furnace or stove. In mild weather more heat is required in the aspirating chimney than when the outside temperature is low.

When several rooms are vented into one common vent shaft there will frequently be an excessive outflow from one room, while it may be deficient from others.

In one large vent shaft there are more likely to be eddies and counter currents than where several smaller vent flues are used. When the ventilation of several rooms into one large shaft is attempted, the location of the steam pipes or radiators will sometimes be a rather difficult matter in order to obtain uniform and economical results from the different rooms.

When, however, no steampipes or radiators are provided in the vent shaft and a stack heater or small stove is installed, as is the case in many school buildings where furnaces are used, the large common vent shaft or aspirating chimney becomes a necessity.

In such cases the ventilation from the lower rooms is through register openings in the floor, and the foul air is taken down to the bottom of the basement and enters the common shaft below the "stack heater."

The air taken down from the lower rooms, being heated by the stack heater in the common shaft, rises, forced up by the denser air on the outside.

A damper should always be provided in these ducts leading from the first story rooms to the bottom of the common vent shaft.

### VENTILATION OF SECOND STORY ROOMS

In the ventilation from the second story rooms enters directly into the common shaft and a curved damper as a deflector is provided at the vent openings from the second story rooms, the ascending air, in passing the curved damper or deflector, will cause an induced current from the second story rooms into the common vent shaft, on the same principle as that of the steam siphon often used in removing bilge-water from vessels propelled by steam.

Many tests have shown that when this system is used the velocity of the foul air from the second story rooms is greater than from the first story, and sometimes it will be necessary to use the damper to check the outflow from the second story.

The only advantage in taking the foul air from the first story rooms down to the bottom of the common vent shaft is to have the stack heater placed conveniently near the other heating apparatus, and to avoid the dust and dirt which would be caused by placing the stack heater above the vent opening directly from the lower rooms into the common shaft.

If the air in the first story school-rooms is 70 degrees F., and the air in the common vent shaft has been raised to 85 degrees F. by the stack heater in the lower part of the common shaft, only 15 degrees of heat are available as a motive force in the shaft at the level of the first story floor to overcome the friction and also to cause an outflow of air in the shaft at that level—70 degrees being required to establish an equilibrium between the down and up ducts at that level. Above this level we have the advantage of the height of the column of warm air between the first and second stories.

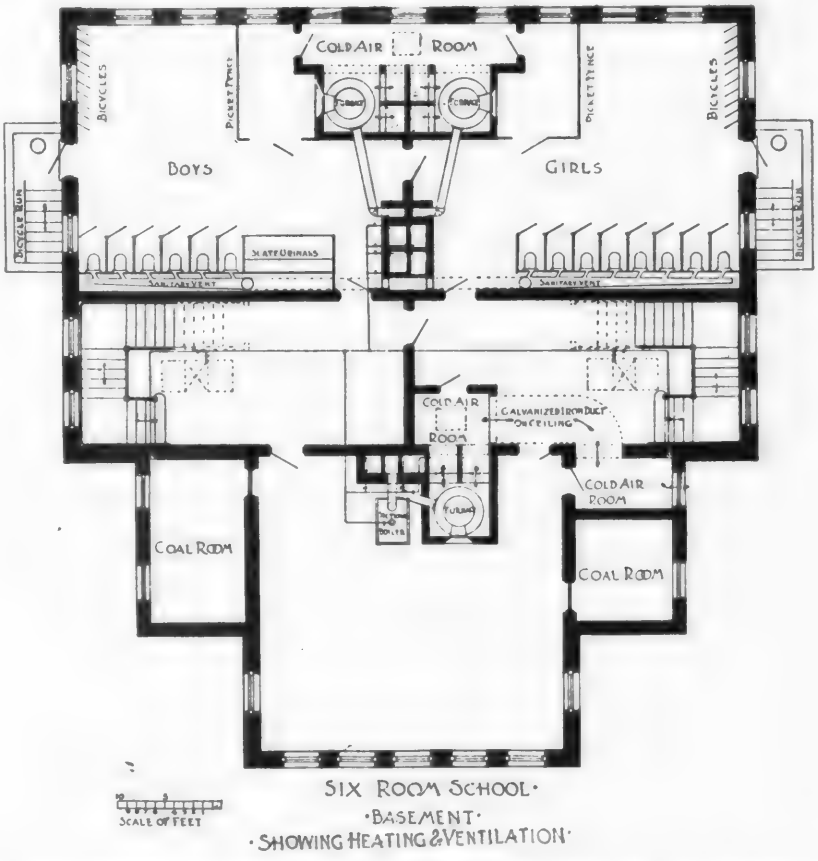
LOCATION OF STACK HEATER

The stack heater should always be placed above the point where the down ducts from the first story enter the common shaft.

When the stack heater is placed below this point a very large waste of fuel takes place, and satisfactory results will not be obtained.

When the stack heater is placed opposite the opening in the shaft where the down duct enters, a considerable quantity of heat is radiated into the down duct and offsets an equal amount of heat in the common shaft.

A design that has been frequently used in heating and ventilating a six-room school building is shown in the accompanying illustrations.




PLAN OF BASEMENT IN SIX-ROOM SCHOOL, SHOWING HEATING AND VENTILATING

The building is constructed of red brick with terra-cotta trimmings, slated roof and copper gutters.

There are six class-rooms, each 28 x 32 x 12 feet and intended to accommodate 49 pupils. In the second story are two small rooms for the teachers' use.

The seats in four class rooms are arranged to receive the light from the

left and rear, and in two class-rooms the light is chiefly from the left.

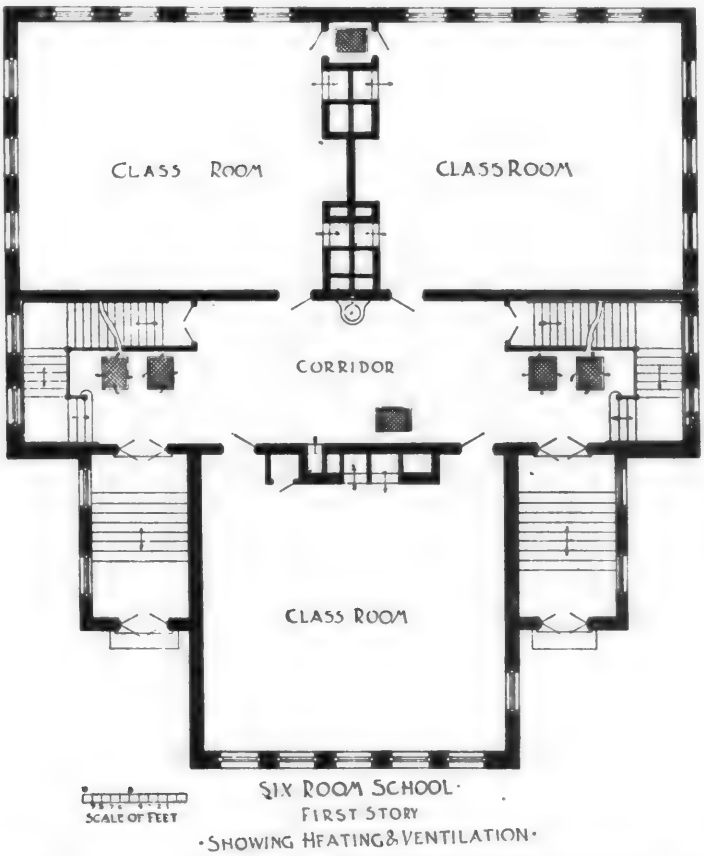
The corridors are 15 feet wide and contain the clothing racks. Doors from the corridors to the class-rooms have each a large center panel of heavy glass, and transoms are provided over the doors.

In the basement are three rooms, a divided corridor, fuel and cold-air rooms.

The fresh warm-air flues and the vent flues for the class-rooms are of the same size and fitted with mixing-

is the same as that given for a five-room school, except that the assembly hall in the five-room building is replaced by two class-rooms, and the heating is by a combination of furnaces and steam heat. The six class-rooms are heated by three large brick-set furnaces, two rooms for each furnace. A cast-iron sectional boiler is provided for heating the corridors, vent-flues, foot-warmers and teachers' rooms.

If desired, the boiler may be of sufficient size to warm the basement




PLAN OF FIRST STORY IN SIX-ROOM SCHOOL, SHOWING LOCATION OF REGISTERS

valves, dampers and steam radiation, as prreviously described for a four or five room school-house, except that the sanitary vent flues are 24 x 24 inches area.

Rotating registers are also provided. There are two foot-warmers in the lower corridor.

The general plan of the building

rooms by lines of one-and-one-fourth-inch steam-pipes placed near ceiling.

By the use of this boiler very satisfactory results are obtained, and the number of fires reduced from what would be required if coal-burning stack-heaters and an additional furnace were used to heat the corridor and vent-flues.

# AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

## Mid-Summer Meeting, Chicago, Ill., July 19-20, 1906

With a programme approaching in importance and variety that provided for an annual meeting, the heating and ventilating engineers are looking forward with keen anticipation to their mid-summer session in Chicago this month. Especially notable in the programme are the topics for discussion, which include not only a wide range of subjects but, from the various sources from which they come, represent, to an unusual degree, the practical questions that are arising nowadays in the profession. Following is the programme in full:

FIRST SESSION, THURSDAY MORNING, JULY 19, 10 O'CLOCK

Paper.

Heat Losses and Heat Transmission. By Walter Jones, Stourbridge, England.

Topics for Discussion.

No. 1. The comparative relation between the completeness of air removal and the efficiency of steam radiators.

No. 2. The proper air space between the surfaces exposed in the heaters of blower systems.

No. 3. In blower systems of heating and ventilation, what are the maximum allowable velocities in the different parts of the system, and what limits the velocity and why is it limited?

No. 4. Summer tests of heating systems.

SECOND SESSION, THURSDAY AFTERNOON, JULY 19, 2 O'CLOCK

Discussion.

Preliminary Reports of Special Committees and The Application for a Charter for a Local Chapter of the Society.

Paper.

The Elimination of Redundant Parts in the Forced Circulation of Hot Water. By A. H. Barker, Trowbridge, England (nonmember), presented by request.

Topics for Discussion.

No. 5. Natural versus mechanical and upward versus downward ventilation for rooms in school and larger auditoriums.

No. 6. The advantages attending the use of steam and hot water in heating a number of buildings requiring 150 to 200 H. P. from a central plant.

No. 7. The best method of calculating the sizes of mains in a hot water heating plant.

No. 8. The effect of the size of the mains on the height of the water line in different parts of a gravity steam heating system.

No. 9. The relative economy in fuel of steam, vapor, vacuum and hot water heating for residences.

THIRD SESSION, FRIDAY MORNING, JULY 20, 10 O'CLOCK

Paper.

Notes on the Use of Feed Water Heaters in Connection with Heating Systems. By Wm. G. Snow.

Paper.

Fads and Fallacies in Hot Air Heating. By R. S. Thompson.

Topics for Discussion.

No. 10. The relation of heat units per cubic foot and the cost of gas to its economical and possible use in heating water.

No. 11. In a hot air furnace burning 5 pounds of anthracite coal per square foot of grate per hour, what proportion of heating surface should be provided in relation to the grate surface to insure economy and efficiency?

No. 12. When the cubic contents and temperature of the air supply are known, what velocity should be considered when determining the size of the horizontal and vertical pipes and register outlets in a warm air heating system with outside air supply, and when the air is circulated, also the size of these air supply ducts and the velocity in them?

FOURTH SESSION, FRIDAY AFTERNOON, JULY 20, 2 O'CLOCK

Paper.

Wall Radiators versus Long Pipe Coils. By J. A. Donnelly (member of the society).

Paper.

An Improved Application of Hot Air Heating. By A. O. Jones (member of the society).

Topics for Discussion.

No. 13. The desirability of accumulating data as to the life of wrought iron and steel pipes in steam and hot water heating systems.

No. 14. Chimneys versus forced draft and their relative advantages.

No. 15. The durability of different kinds of nipples for connecting radiator sections relative to the material

In the following pages will be found papers read at this meeting.

# The Elimination of Redundant Parts in the Forced Circulation of Hot Water

By A. H Barker, Trowbridge, England

(Non-member of the Society, presented by request)

A. H. BARKER

THE system described in the present paper is the outcome of an attempt to utilize two of the properties of steam which chiefly make up its value to the heating engineer —viz., its latent heat and its pressure—in such a way as to eliminate the redundant parts of a pump-circulated hot-water apparatus of the ordinary type.

The standard method of heating water by steam and circulating it, is to use a calorifier or steam-tube heater, and to propel the heated water by means of a duplex pump. If this combination is analyzed into its elements it will be seen that there are several parts which are functionally redundant, and which, therefore, if for no other reason (of which, however, there are many), ought to be dispensed with.

In the heating of the water, for instance, the essential requirement is to transfer the heat of the steam to the circulating water as quickly as possible. In the ordinary method the surface of a metal tube is interposed between the heat of the steam and the water, and all the heat communicated to the water must be conducted through the surface of this metal tube. When we come to inquire into the fundamental reason for the use of the tube, it will be clear that it is not required for the primary purpose of conducting the heat of the steam to the water, because this process will take place much more quickly and efficiently without any tube being interposed. Neither is it required primarily for the purpose of keeping separate the water of condensation from the heated water, for (except in the case of water heated for domestic hot-water supply, in which case the water on the two sides of the tube surface is different in quality, one being hard and the other soft) there exists no reason why the condensed water should be kept separate from the circulating water.

The really fundamental reason for the use of the tube between the water and steam is not that it is a device for filtering the heat of the steam away from the condensed water, but for filtering the heat of the steam away from the pressure of the steam, if I may be allowed to use such an expression. In other words, the tube interposed between the water and the steam has as its nescesary qualifications for its duty (1) the thermal conductivity necessary to allow the heat to pass, and (2) the mechanical strength necessary to retain the steam and to resist the difference in pressure between the water and the steam.

If you have steam at different pressures the heat of which is to be communicated to the same circulating water, it is for the same reason necessary either to reduce the pressure of the higher to the same value as that of the lower, if using only one tube heater, or to use a separate tube heater for each different pressure employed.

There is in the tube-heater system yet another redundant part. When the heat has been filtered out of the steam, the steam itself disappears as steam, and a certain amount of condensed water takes its place. This water must be got rid of somehow, otherwise it will prevent the access of more steam to the heating surface. It must be either returned to the boiler as feed water or thrown away, and here again the existence in this condensed water of both heat and pressure together introduces another set of problems. This water is often at a temperature far above that at which it can exist as water at the atmospheric pressure, and the necessary requirement is to return this water to the boiler as directly as possible, with as little loss of its heat as may be.

The standard or usual method in which this problem is solved is to use a steam trap which is functionally a device for filtering the water away from the steam, which, if it is efficient, drains out the water from the steam without allowing the escape of any steam as such, and returning the condensed water for feed purposes to the boiler chamber at atmospheric pressure. When the water is first transferred by the trap from the pressure of the steam to the atmospheric pressure, its temperature and pressure are such that a portion of it instantaneously explodes into steam, thereby reducing the temperature of the remainder to such an extent that it can exist as water at the atmospheric pressure. By this process some of the heat of the condensed water is deliberately wasted in order to secure the easy transference of the water freed from pressure, as water, again to the boiler, or, it may be, to the drain.

From this point of view, therefore, the steam trap is seen to be merely a somewhat clumsy device for dealing with the pressure of condensed water and reducing

it to the atmospheric pressure by a process of wasting part of its heat.

It will thus be clear that the heating tube of the calorifier and the steam trap are introduced into a heating system solely on account of the necessity of equalizing the various pressures as between the static head of the circulating water on the one hand, the boiler pressure on the other and the atmospheric pressure on the third.

The next series of redundant parts in this system are found in the pump.

The primary function of the pump is to utilize the pressure of the boiler steam in order to press the heated water round the circuit of pipes. Functionally the method by which this result is secured is to place two check valves in series in the water circuit so that the water can only travel one way round. The water space between these two check valves is arranged so that it can continuously be alternately expanded and contracted. Thus water is drawn from the return pipe of the system and delivered into the flow pipe. At some point of the system the heater is fixed for maintaining the temperature.

The method of securing the alternate expansion and contraction of the portion of the circuit between the two check valves, is a water piston and cylinder actuated by a steam piston and cylinder.

Now just as there exists no reason other than the difference in pressures why the water should not be heated by direct contact with the heat of steam without the interposition of a tube, just so there exists no reason, except the difference of temperature, why the pressure of the steam should not be communicated direct to the water without the interposition of two pistons and a piston rod, and all that they entail in the way of glands, guides, stuffing boxes, etc.

Functionally the reason for the existence of a pump is the exact opposite of that which justifies the calorifier tube. For, whereas the calorifier tube is a means of communicating the heat of the steam to the water without at the same time communicating its pressure, by interposing the substance of a tube between the two, just so the pump is a means for communicating some of the pressure of the steam to the water without at the same time communicating its heat. It does this by interposing two pistons and a piston rod, or pump plunger or its equivalent, between the steam and the water. It is important to notice that both the pump and the calorifier are in reality filters for filtering the heat of the steam away from its pressure. They do this in an opposite sense, the calorifier using the heat and rejecting the pressure, and the pump using the pressure, and if not actually rejecting the heat, at least communicating it to the water by other means.

It will thus again be seen that the reason for the existence of all these redundant parts is the necessity of equating the pressures as between the various parts of the system.

Now the object of this system is to dispense with all these redundant parts (viz., the calorifier tube with all that it entails in the way of traps and valves, the redundant parts of the pump, with all they entail in the way of lubrication, packing and dirty condensation) by tackling the pressure problem. Once that problem is solved, as in this system, the *raison d'être* of all the redundant parts disappears. As is almost invariably the case, the elimination of redundant parts is attended by an improvement in working, ease of manipulation and cheapness of construction, and the present case is no exception to that rule.

The method adopted in this system for the elimination of these redundant parts is in principle as follows:

(1) To release the pressure of water in the return pipe from the static head due to the height of the expansion tank by means of a buoy valve. This produces a powerful circulation in the system of pipes. The water from the buoy valve is delivered on the uppermost of a vertical series of perforated horizontal trays fixed one above the other within the heater, and falls from one tray to the other in a shower of drops.

(2) To release the pressure of the steam from the boiler pressure through a simple form of load valve into the upper part of the same chamber. The steam thus silently heats the water by direct contact, and the heated water falls into the bottom of the heater.

(3) After being heated the water is allowed to flow into a second vessel, which is practically a float pump, through a check valve. When this vessel is full, steam pressure direct from the boiler is automatically admitted above the surface of the water, and puts the water again under the static head due to the height of the expansion tank by forcing it again into the main without agitation and therefore silently, as fast as it is received from the heater.

In order to avoid the possibility of a rapid change of temperature in the mains or radiators owing to the sudden turning on or cutting off of the steam supply, it is found to be advisable to deliver the water from the ejector direct to the expansion tank, the water in which acts as a sort of temperature buffer between the heat of the steam and the pipes.

The common pressure to which both the water and the steam are reduced depends on the character of the apparatus and the source of the steam to be used.

If, as often happens in large installations, some or all of the heat is derived from exhaust steam from electric-light engines working non-condensing, it is necessary that the reduced pressure should be that of the atmosphere; in other words, that the apparatus should be connected to the atmosphere by an open pipe.

In this case, if there is not enough ex-

haust steam available to heat the water to the required degree, live steam is turned into the same heater by a thermostatically controlled valve.

If the engines are working condensing the pressure in the heater is the same as the absolute value of the back pressure in the engine (neglecting friction in ports and exhaust pipe). In this case the temperature to which the water is heated can never be greater than the temperature corresponding to that back pressure. With a high vacuum this temperature is insufficient for practical purposes, but with a vacuum of 20 inches of mercury good results can be obtained at 160 degrees. Live steam can be turned into this vacuum just as in the case of atmospheric pressure.

In installations operated by low-pressure steam boilers the pressure maintained in the heater is the pressure corresponding to the absolute temperature to which it is desired to raise the water. The pressure is maintained by a simple combination of valves which regulates it automatically in a simple manner.

The smaller type of apparatus up to about 10,000 square feet capacity has both parts of the apparatus cast in one piece, rendering it very inexpensive and compact. In this case the apparatus is installed in the upper part of the circulating system, the expansion tank being in such position as to maintain a head at the level of the ejector not exceeding the working pressure in the boiler. In this case the very low pressure maintained in the heater produces a powerful suction on the return pipe, which added to the difference of level of the expansion tank and the heater, produces a powerful circulating force even at a very low boiler pressure.

In some cases where the pressure driving the ejector is liable to wide fluctuations—as, for instance, when the boiler is left for long periods without attention—it has been found advisable to use a piston pump instead of an ejector. The steam piston has a large area, so that the pump

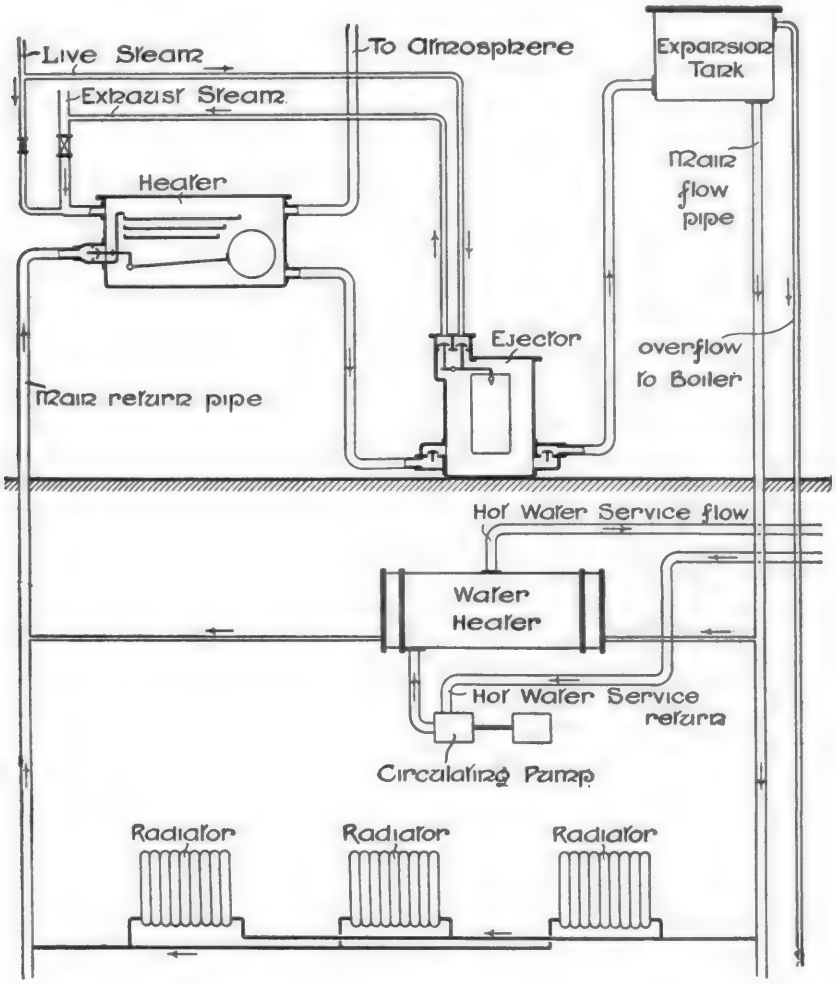



FIG. 1.

can be operated against a fairly high head, at pressures much lower than a float pump which works by direct pressure on the surface of the water. Also the employment of a piston pump is found to be advantageous in cases where the amount of exhaust steam available is ample for all requirements. It is, of course, obvious that the piston pump consumes less live steam than the float pump, in which the steam comes into direct contact with the water. This increased consumption of the float pump is of no moment where the live steam has to be employed in heating the water in the heater if not in the pump, but it would be wasteful if there is already an excess of exhaust. The chief disadvantages of a pump of the piston type are (1) that it entails a continual loss of water by condensation which cannot be returned to the boiler on account of its dirty character, (2) it needs continual attention in the way of cleaning, packing and lubrication. (3) It is also much more expensive than a pump of the float type.

Fig. 1 is a diagram showing the method of connections of the pipes arranged for applying in practice the principles enunciated above. Several very large installations are at work in England with the connections arranged exactly as shown here.

Each radiator or series of radiators in the whole installation is connected on the inlet side to the main flow pipe or to a branch from same. The outlet side of the radiator or series of radiators is similarly connected to the return main, so that the full effect of the circulating power is obtained through each radiator. If the dimensions of the pipes are properly determined, it is therefore impossible for the circulation to fail through any radiator.

The heated water thus put into circulation is used for a great variety of purposes,

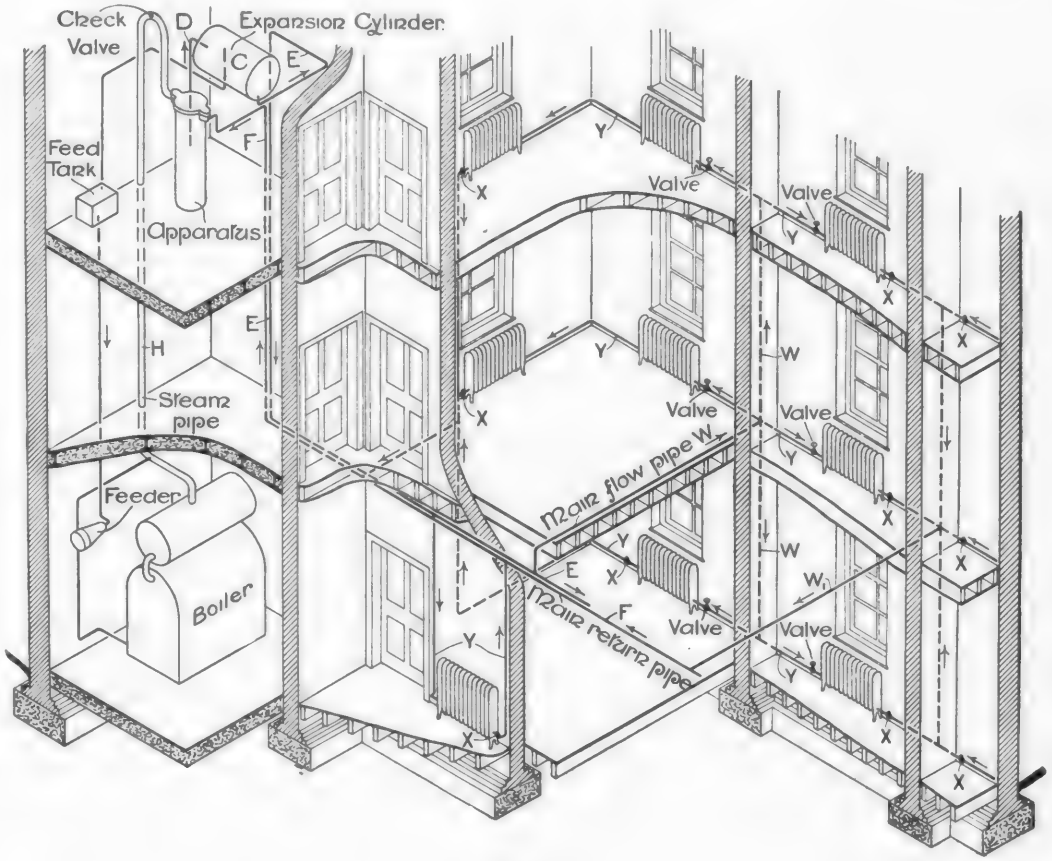



FIG. 2

such as heating, drying, cooking and the heating of other water for hot-water supply to lavatories, sinks and baths. In the latter case the service water is heated by a tube heater receiving its heat from the circulated water.

The originally heated water or primary circulation is not drawn off for any purpose, as this water becomes in a short time practically pure distilled water. It receives a continual accession of pure distilled water from the condensed steam, and parts at the same rate with some of

its own bulk, which is redistilled by the boiler and returned to the circulating system as steam, to be there recondensed. In the limit it will be seen that these conditions lead to the ultimate distillation of the whole body of the circulating water, the overflow from which will be pure distilled water for boiler feeding.

In most cases the whole of the secondary supply of water for service requirements is heated by a tube heater fixed in the heater chamber, whence it is distributed by pump circulation to the various points where it is required, so that there is no apparatus whatever outside the heater chamber. In some cases, however, separate tube heaters are fixed near the points where the supply of hot water is required, so that only one set of mains are required. This is economical, both in first cost and in heat loss, but it is found in some cases less convenient, because it prevents the temperature of the whole of the heating circuit being regulated to suit varying weather conditions without at the same time reducing the temperature of the hot-water supply.

Fig. 2 shows a diagram of the connections where a low-pressure steam boiler supplies all the heat both for heating and circulating. In this case the access of water condensed from the steam in the heater results in a continual accretion of water in the circulating system. An overflow pipe is fixed in the expansion tank and is led direct to the boiler as feed, or in some cases where a very constant water level is desired in the boiler, or where the water capacity of the boiler is limited, to a separate feed tank, whence it is again fed into the boiler through a boiler feeder. Several very large installations on this

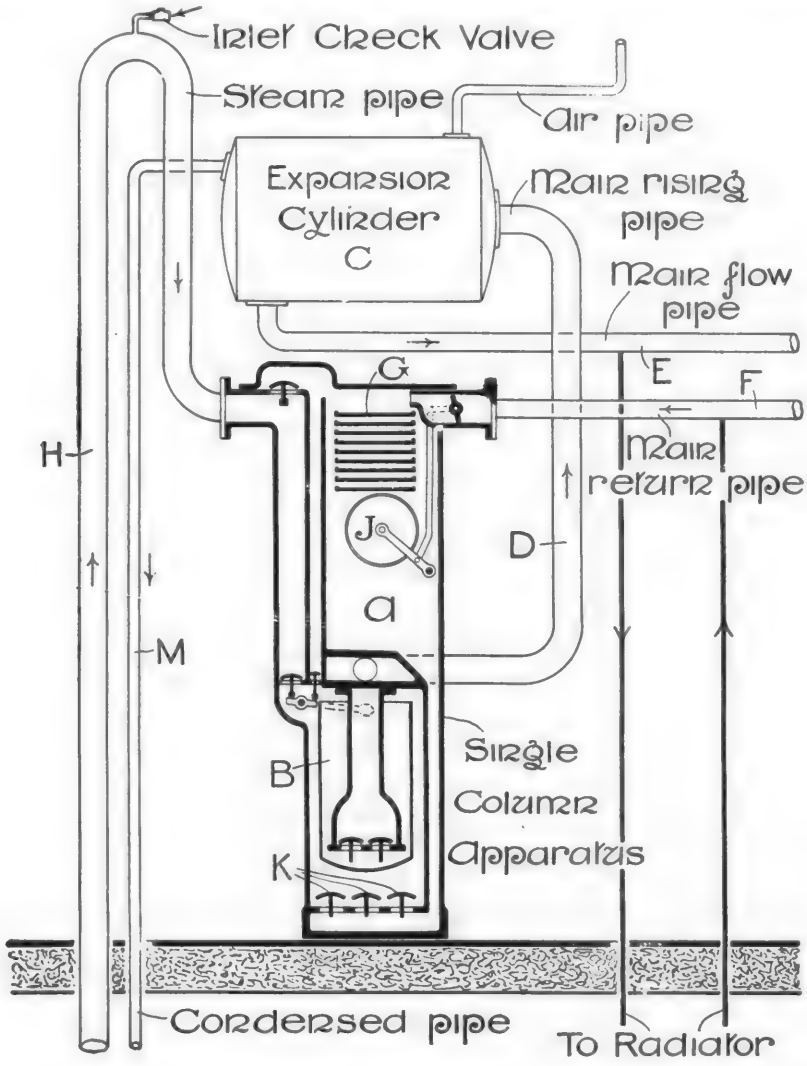



FIG. 3.

principle are now at work in England for heating and hot-water supply.

Figs. 3 and 4 show diagrammatic sections of the self-contained type of apparatus, many of which are now in use.

There is one large installation in England which contains some unusual features dictated by the peculiar conditions to which I will refer in closing.

The conditions laid down by the client were that there must be no apparatus of any kind within 200 feet of the house. That the boiler pressure must not exceed 15 pounds per square inch. That no steam pipe was to be carried into or under the house. That the apparatus must be such that it would at any time require a minimum of attention, and that it would run during the whole of Sunday and the whole of every night absolutely without attention and without the presence of an attendant being necessary. That it should automatically condense the whole of the exhaust steam given off at any time by a pair of 60 horse-power electric-light engines. That the whole of the apparatus was to be in duplicate, so that either apparatus would do the whole of the work, and that any portion of the apparatus being out of gear would not produce a stoppage. Yet a further requirement was that that the hot-water service apparatus must be entirely independent of the heating apparatus; that the conservatory and certain other rooms should be arranged to be heated at will either by the heating system or the system supplying heat to the service appratus, and finally that the shutting off of the heating apparatus in summer should absolutely shut off the heat from every pipe passing into the house except the pipes for the secondary hot-water supply system.

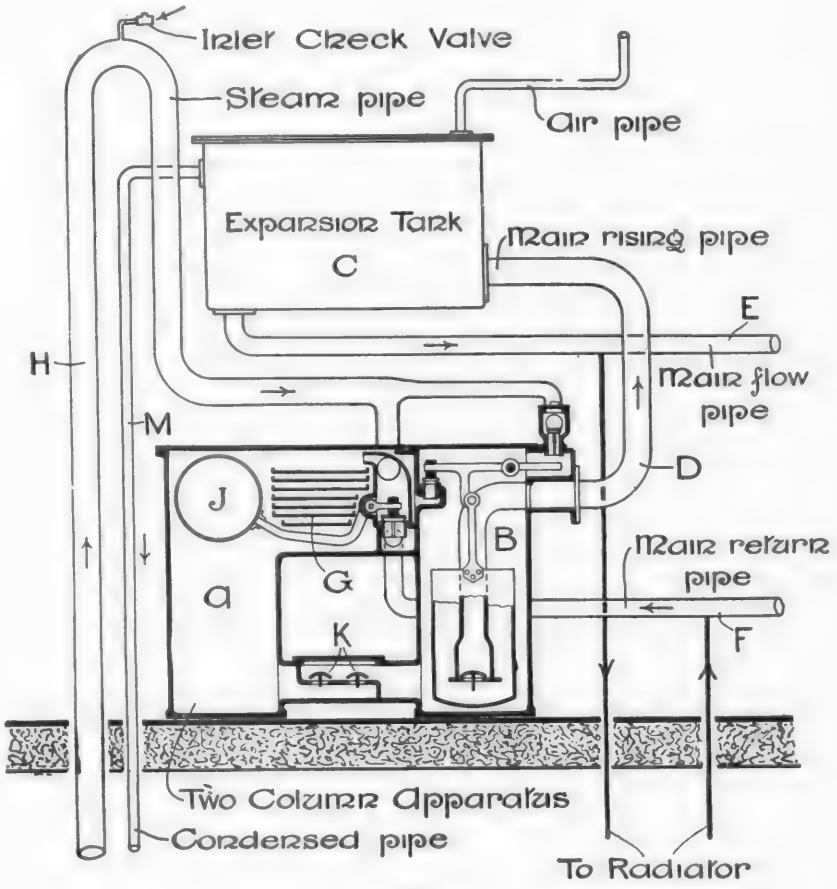



FIG 4.

The boiler chamber was so low that it was impossible to command the upper part of the house by a tank placed at the top of the boiler chamber. It was, therefore, necessary to provide two entirely separate systems, one with a relatively high pressure or head, in order to command the radiators on the third floor of the house for heating purposes, and the other with a relatively low head owing to the impossibility of placing the tank at a sufficiently

high level, there being no building except the house itself sufficiently high, and the presence of a hot tank in the house in the summer months being forbidden.

The boiler pressure had to be not more than 15 pounds per square inch, which made it impossible to reach the top of the house by direct pressure, so that a pair of reciprocating pumps had to be supplied with large steam pistons to overcome this pressure. The boilers had to be sectional cast iron, arranged for automatic self-regulation, and the pressure in them was too high to allow them to be fed by gravity direct from the low-level primary expansion tank for the supply of heat to the service system. Further, the necessity of running the two systems simultaneously and of feeding the boilers automatically from either or both systems, and the certainty that the accretion of water from the condensed steam from the electric engines would intermittently overflow from both systems (all of which surplus water could not be allowed to get into the boilers, as it would, of course, have completely flooded them), made up together one of the most difficult problems that I have ever had to deal with.

I solved it, however, quite satisfactorily by means of this apparatus, and the installation has now been at work under the above conditions for some months.

The method of solution was as follows: Two identical systems are arranged exactly as shown in Fig. 1, except that on account of the high level of the heating system tank it was necessary to employ two similar duplex pumps, one for each service, instead of the float pumps indicated in Fig. 1.

On account of the necessity for the automatic regulation of the boilers steam is provided by three large sectional cast-iron boilers, having large fuel capacity and working at from 7 to 12 pounds per square inch.

The main exhaust pipe from the electric engines after passing through an oil separator is connected direct to the heaters with free outlet on the other side to the atmosphere. When the engines are stopped or when the steam from them is insufficient, steam from the low-pressure boilers is admitted through a load valve.

The heating or high-level expansion tank is fixed at the top of the house, and the heating pump, operated by steam from the sectional boilers, delivers the heated water into this tank, whence it is distributed to the radiators, returning to the pump chamber to be reheated.

The low-level expansion tank is fixed at the top of the boiler house, and the circulation from this tank operates a pair of tube heaters under the house 200 feet away. From these heaters a natural secondary circulation is secured to the draw-off taps. The conservatory, the billard room, and some other radiators are connected by special duplex valves to either system, so that it is impossible to open one without at the same time closing the other. This avoids any possibility of emptying the high-level system into the low-level system by any carelessness in leaving both valves open.

The satisfactory feeding of the boilers was the greatest difficulty. It was not possible to feed from the high-level system only, as this would have allowed all the steam condensed in the low-level system to escape, and would have called for a continual supply of hard water to the boilers to make up for this loss. On the other hand, the height of the low-level expansion tank was not sufficient to enable this water to be fed into the boilers by gravity.

This difficulty was got over as follows: The overflow from the high-level expansion tank is led into the low-level expansion tank, which therefore receives the whole of the surplus water condensed from the electric exhaust, as well as the water condensed from the steam supplied by the low-pressure boilers to the apparatus.

The expansion tank of the low-level system is connected to a return trap, and the water from the return trap is fed into the boilers through a pair fo automatic boiler feeders, which only allow the trap to feed into the boilers as much water as is required to maintain the water level. The overflow from the low-level expansion tank is led into the main feed tank, from which the feed supply to the main high-pressure electric-light boilers are fed.

The low-level expansion tank is thus kept always full, and any condensed make-up required to replace the little water lost in the condensation in the pumps (which cannot be returned to the boilers on account of its greasy character) is thus supplied, and there is no danger of flooding the boilers.

The boilers have sufficient fuel capacity for a 12 to 15 hour run at low power, and the only regulation required in the apparatus is the adjustment of a jockey weight on the lever of the automatic regulator controlling the draft in the boilers, which without any other adjustment whatever controls the whole apparatus from the lowert to the highest powers.

There are many other installations in England in which the only attention required to the system is stoking three times in 24 hours, the apparatus working day and night and producing automatically all the results obtainable from a pump system.

This is sufficient to show that the elimination of redundant parts is in this case, as usual, attended with an improved simplicity of working.

# Notes on the Use of Feed-Water Heaters in Connection With Heating Systems

By Wm. G. Snow
(*Member of the Society*)

WILLIAM G. SNOW

WHILE it is a fact, with which heating engineers are familiar, that every 10 degrees rise in the feed-water temperature corresponds to about one per cent. saving in fuel, this gain in economy is apparently frequently overlooked by manufacturers and owners. Feed-water heaters faulty in design or of insufficient capacity are installed; live steam is used where exhaust would do as well; condensation is allowed to go to waste which could easily be utilized; and heat units which should be saved are lost in other ways.

It is the purpose of this paper to point out certain features in the application of feed-water heaters in connection with heating systems.

In certain kinds of manufacturing plants having many hot greasy drips from machines, this water is made to flow through the pipes of a horizontal heater as illustrated in Fig. 1, the boiler feed water filling the space between the tubes and the shell.

Exhaust from pumps and other apparatus may be discharged through the same heater if desired.

The coldest feed water surrounds the lower pipes containing the least hot drips, so that they pass from the heater to the sewer at relatively low temperatures, having transferred most of their heat to the feed water.

The flow of hot condensation through such heaters is apt to be irregular, and in most cases would be hardly sufficient to bring the feed water to the desired temperature, therefore it is customary to use a regular "closed" heater as a reheater supplied with exhaust steam from the main engine.

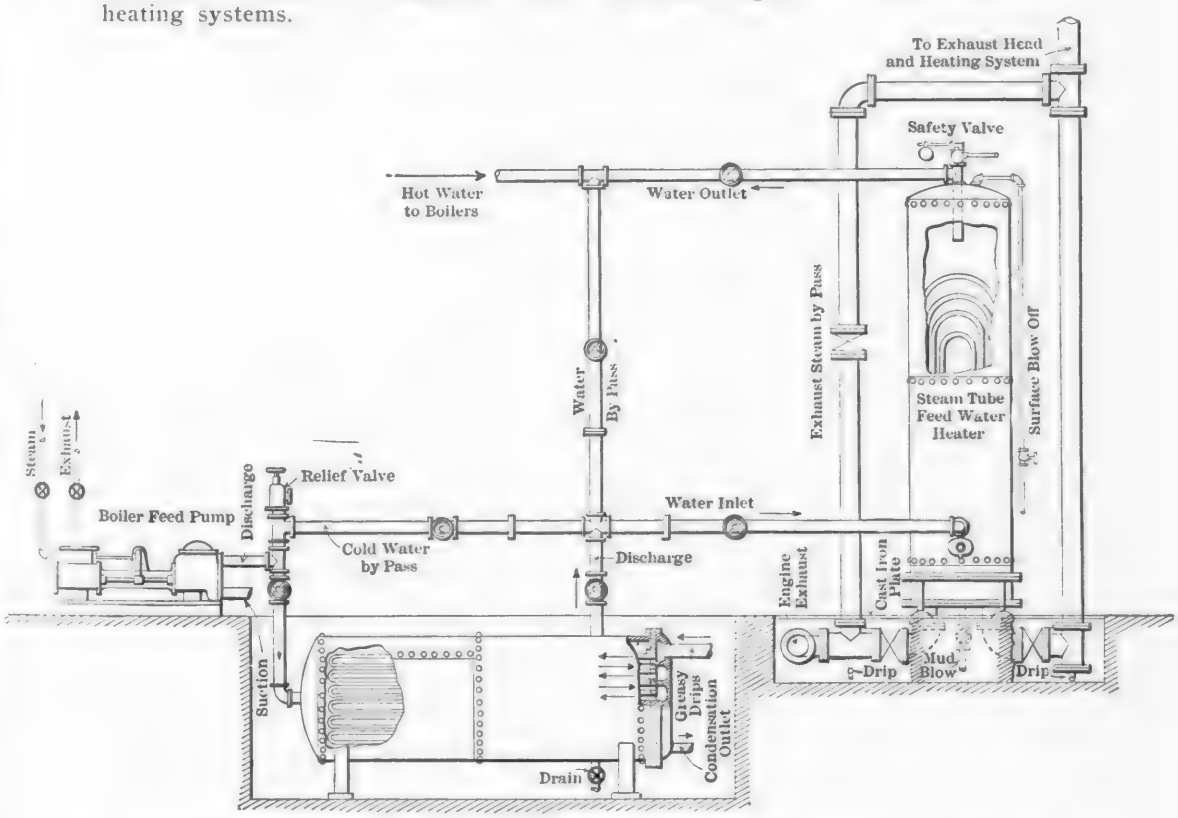



FIG. 1.—SHOWING ARRANGEMENT OF CLOSED FEED-WATER HEATERS IN CONNECTION WITH HEATING SYSTEMS

Valved by-passes are provided as indicated for use in case of repairs or cleaning.

In some buildings, cold water en route to the feed-water heaters is forced through coils placed in drip tanks and blow-off tanks for the purpose of utilizing some of the heat that would otherwise be wasted, and to provide for cooling the water that would cause injury to sewer connections if discharged at too high a temperature.

Until recent years the method most commonly adopted in large city buildings is shown in Fig. 2.

(3) By means of corrugated tubes fixed at both ends.

(4) By the use of coils of brass or copper pipes.

Tests on water-tube feed-water heaters are stated to have shown that when the water was pumped through the heater at such a rate that the final temperature was within 15 degrees of the temperature of the steam, the transmission per square foot of tube surface was about twice as great as when the water was pumped through so slowly that its final temperature was within 5 degrees of the temperature of the steam.

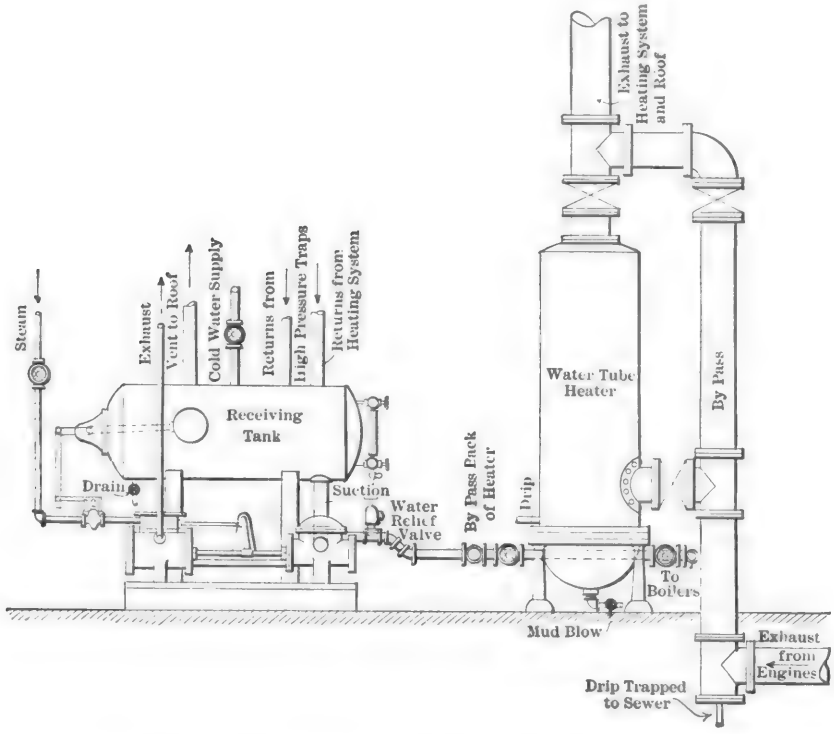



FIG. 2.—SHOWING ARRANGEMENT OF PUMP AND RECEIVER AND CLOSED FEED-WATER HEATER IN CONNECTION WITH HEATING SYSTEM

The receiver should be placed well above the suction valves of the pump to provide sufficient head to cause the water to properly follow the piston and prevent the racing of the pump.

Closed heaters are of the steam-tube or water-tube type, the expansion of the tubes being provided for, as a rule,

(1) By the use of "U"-shaped tubes.

(2) By tubes fixed at both ends, the drum at one end being fitted with an outlet pipe working through a stuffing box.

This shows that when a closed heater of this type is forced the efficiency of the heating surface is greatly increased, due to the more rapid rate at which the water is forced through the pipes, and to the greater difference between the temperature of the steam and the average temperature of the water.

Steam-tube heaters have a relatively small overload capacity on account of the sluggish circulation of water between the pipes and the shell.

Closed heaters generally contain from

one-third to one-half square foot of heating surface per horse power, which, on the basis of raising 30 pounds of water per hour from, say, 50 degrees to 200 degrees, is equal to a heat transmission of from 30 × (200 — 50) = 4,500 heat units to one-third or one-half square foot, or 13,500 or 9,000 heat units per square foot respectively.

As such surface becomes fouled by the accumulation of scale or sediment on one side and cylinder oil on the other, the efficiency of the heater rapidly decreases.

It is probably safe to say that closed feed-water heaters bought in competition are seldom provided with sufficient surface to raise the temperature of the boiler feed water to more than 200 degrees.

Closed heaters of the steam-tube type must have shells strong enough to withstand a pressure in excess of that in the boiler.

A relief valve should be placed in the pump discharge line, otherwise excessive pressure will be produced in the heater when the boiler feed valves are suddenly closed, and will cause undue wear and tear.

Heaters arranged to circulate steam through the coils, the water occupying the space between the pipes and the shell, deteriorate, as a rule, more rapidly than when the water circulates through the coils surrounded by steam.

Cast-iron shells are preferred by many engineers to those made of steel plate on account of their greater durability.

Steam-tube heaters provide much greater storage capacity for hot water than do those of the water-tube type.

Storage capacity means that more time is afforded for the settlement of impurities, any heavy sediment being removed through the mud-blow, lighter impurities being discharged through the surface blow-off.

The piping in Figs. 1 and 2 show full-sized by-passes, which are commonly employed to give the most efficient circulation of steam through the heater. The condensation from this steam is wasted to the sewer.

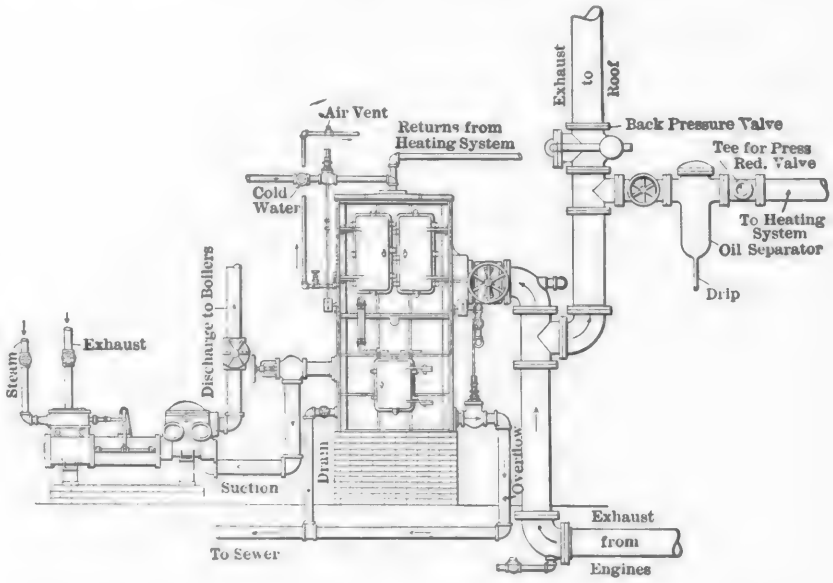



FIG. 3.—ELEVATION SHOWING ARRANGEMENT OF "DIRECT CONTACT" OR OPEN FEED-WATER HEATER IN CONNECTION WITH HEATING SYSTEM

Since only a portion of the exhaust steam is condensed, branch pipes to and from the heater considerably smaller than the main exhaust pipe are sometimes used. When this is done care must be taken to properly vent the heater to prevent air binding.

When water-tube coil heaters are used, one or more coils are sometimes connected with the hot water tank or generator that supplies hot water to the building on the same principle as a water back in a range, the water being reheated by live steam coils in the tank.

Fig. 3 illustrates a modern method of handling the condensation from a heating system, at the same time providing for the heating of and additional water supply required by the boilers,

the feed-water heater combining also the function of a receiver for returns from the heating system.

It is unnecessary to force all the exhaust steam through a feed-water heater of the direct contact or open type, since the condensation of about one-sixth of the engine exhaust is sufficient to heat the water necessary to take its place in the boiler.

Assume, for example, that the engine is exhausting to the atmosphere with practically no back-pressure. The latent heat of steam at atmospheric pressure is 966 heat units. To heat 1 pound of water from, say, 50 degrees to 210 degrees, requires 160 heat units, equivalent to the amount contained in about one-sixth pound of exhaust steam. If all the exhaust steam is passed through the heater about five-sixths of it passes up the exhaust pipe uncondensed, and the passing of this oil-laden steam through the separator and the heater imposes an unnecessary burden on them, besides adding to the cost of the piping due to the by-pass required.

A valved by-pass aside from the cost introduces an element of danger, since in case of faulty operation of the valves, the heater would be subjected to an excessive pressure which would be likely to cause its disruption.

With open heaters practically no resistance is offered to the ingress of exhaust steam, hence no appreciable increase in back pressure on the engine is necessary to keep these heaters properly supplied with steam.

Direct-contact or open heaters, in which the steam and water come into direct contact, always retain their maximum original efficiency in the transference of the heat in the steam to the water. No fouling of surfaces affects this efficiency. The main criticism raised against them by some engineers is the dangers from oil getting into the boilers.

Of course the character of the water has much to do with the selection of a heater, the open heater being very commonly used in sections where bad water is encountered. This type of heater affords ample space for the settlement of organic impurities, and the high temperature secured precipitates the carbonates of lime and magnesia, which are deposited in a settling chamber provided for the purpose.

To precipitate the sulphates, temperatures in the vicinity of 300 degrees are required which are far beyond the range of exhaust steam heaters.

This paper, however, is not a treatise on chemical heaters, although those of the open type are frequently fitted with tanks and apparatus for introducing chemicals for softening the water, which must be supplied in addition to the returns from the heating system or during the season when heating is not required.

Returning now to the question of eliminating the oil contained in the steam, the greater portion of this is removed by the separator; the coke filter, some 18 inches thick, being depended on to reduce the amount left to a harmless percentage. These heaters may easily be re-coked; in fact, all portions of the interior are accessible through large doors made tight by the use of gaskets.

The great and increasing number of such heaters in daily use would appear to the unbiased to be pretty satisfactory proof that the oil question is successfully disposed of.

Some engineers object to the pumping of hot water, which is necessary when using direct-contact or open heaters, they claiming that the hot water causes rapid deterioration of packing and valves. When the heater is set sufficiently high to bring the water level 3 feet or more above the suction valves of the pump, no trouble should be experienced in pumping hot water, as there will then be sufficient head to cause the water to follow the piston and prevent racing.

Sometimes when a heater is set low with reference to the pump, the substitution of lighter springs on the suction valves will overcome racing that may have been experienced.

As to the best material to use for valves for hot-water service, many engineers prefer all metal valves instead of hard rubber. Such valves give good service and are considered by many to be worth the additional cost. Somewhat more care must be exercised in selecting piston packing than for cold-water pumps, especially in the case of end or center-packed plunger pumps, but this is only a detail, and hundreds of plants have pumps working successfully under the conditions stated.

The great storage capacity for hot water in direct-contact or open heaters is an advantage in meeting any sudden increase in the load on the boilers.

The condensation returned from the heating system is from steam that has passed through a separator. After this condensation has passed through the coke filter in the heater, it is in condition to be returned to the boilers.

All steam condensed in heating the water in the heater is likewise returned to the boilers, and is no inconsiderable item of economy when water must be bought at city rates, amounting, as it does, to not far from one-seventh of all the water required.

There is no denying the fact that a greater amount of attention and more intelligent attention is necessary when the most efficient modern devices are used to save fuel. The extra cost of such additional attendance is, however, a small item in comparison with the saving secured.

# Fads and Fallacies in Hot-Air Heating

By R. S. Thompson

(*Member of the Society*)

R. S. THOMPSON.

THAT I may not seem to claim all wisdom in this matter, I ask you to interpolate the words "it is my opinion" before each of my statements. These are my "opinions" based on study, observation and experience. Some of them will probably commend themselves to your judgment. Some may be fads of my own. Some may themselves be fallacies. I believe they are all worthy of your consideration and discussion.

It is a fallacy to suppose that a set of rules can be formulated by the observance of which any man can heat any building. In no two buildings will exactly the same conditions be found. Each building is a proposition to itself. Without an intelligent comprehension of the principles involved, an ability to closely examine conditions, ascertain causes, reason from effect to cause and from cause to remedy, a set of rules may be more of a hindrance than a help. There is no profession in which "a little learning" is more often "a dangerous thing."

### CASE OF A POORLY-HEATED CHURCH

Something over a year ago I was called to examine a large church, the heating of which had been a perplexing problem for more than a generation. The auditorium was always cold for at least two or three feet above the floor. I noticed that even when the church had been long heated there seemed to be downward currents of cold air.

There was unanimity of opinion that something must be done to draw the cold air off the floor. One party had suggested putting in an electric fan and pump it out. At one time the plan had been tried of cutting off the bottoms of the doors into the vestibule and leaving open the door from the vestibule into the tower. The draft of the tower had caused a strong outward flow of cold air under the doors, but the congregation complained so bitterly of cold feet that the plan was abandoned.

### BUILDING LEAKED AT TOP

After learning all I could about the plans which had failed, I proceeded to diagnose the case. I had all three furnaces fired to the limit for three hours, and then sought carefully for evidences of "back pressure." I found none. Instead, I found at the bottom of every door and window a strong inward current of air. That explained the situation. The building was leaking at the top—leaking so badly that all the air the furnaces could supply was being lost by leakage, and more was being drawn in from outside, which, being cold, of course settled on the floor. Had I followed the rule, "draw the cold air off the floor" (which is the correct rule when a room is "air-bound," and there is "back pressure" on the furnaces), I would simply have drawn in more cold air to settle on the floor. This explained the failure of the plan to use the tower as a pump. This explained the downward currents of cold air.

As the leaks could not be stopped, the only remedy was to pour in hot air faster than it could leak out at the top, and so "push" the cold air off the floor.

I examined the furnaces and found that when working up to the limit the three could deliver about 1,400 cubic feet of air per minute. I took out two of them and put in two others with a combined capacity of 4,000 cubic feet per minute, putting in larger pipes to allow this larger flow. With these two going, I again examined the building and found air flowing out gently under al the outer doors, but not enough to "back pressure" to interfere with the operation of the furnaces. The congregation have not had cold feet since.

### IMPORTANCE OF CONSIDERING WALL SURFACE

It is a fallacy to suppose that you can determine the amount of heat needed for a room or building by ascertaining its cubical contents.

Heat once put into a building would remain there forever, and a building once heated would require no further heat to maintain the temperature were it not for leakage of hot air out and leakage of cold air in and conduction of heat through the walls. But leakage and conduction both depend entirely on wall surface, and not at all on cubic contents, so that wall surface is the only thing to be considered.

I have adopted a rough and ready rule which works well in most cases with the average house, but which, like all other rules, must be used with common sense.

"Divide the number of square feet exposed wall surface by 2. The product is the number of cubic feet of air at 140 degrees that will be required per minute to maintain a temperature of 70 degrees with the outside temperature at zero."

Of course, it is up to the engineer to determine how many cubic feet of air at 140 degrees any given furnace can supply, and how many cubic feet per minute each pipe can deliver. Rough and ready rules

will not do in this estimate; an 8-inch pipe will deliver more air under some conditions than a 12-inch pipe will deliver under other conditions.

It is a fad to cover hot-air pipes with a thin sheet of asbestos paper, in order to "keep in the heat." The rough surface of the paper is a better radiator than the bright surface of tin or galvanized iron, and this more than balances the slight gain from the non-conducting power of the sheet of paper. Being spongy, it retains moisture and rots the pipes. The only good purpose I have ever known it to serve is to hide bad joints and botch work. If you must use asbestos, put on half an inch.

It is a fad to set the furnace under the northwest corner of the house with the idea that the air will travel through the pipes more readily in the direction the wind is blowing. Air, while in the pipes, does not know and does not care which way the wind is blowing. Set the furnace where you can reach all the rooms with the shortest pipes and the fewest angles.

It is a fallacy to suppose that you must put a register in the coldest part of the room in order to heat it. It is no warmer six inches away from the current of air that flows from a register than in any other part of a room. The air issuing from a register goes directly to the top of the room, and all heating with hot air is from above downward, no matter where the registers are placed. I should like to try the experiment of heating a house with all the registers in the ceilings. It would at least be a novelty, and I believe would have many advantages.

It is a fallacy to put a register near an outside door or window in order that the wind which blows in through the cracks may drive the hot air over to the back part of the room. If the furnace is working properly there will be an outflow instead of an inflow of air around doors and windows. If the hot air enters near these leaks it will flow out through them and the cold air will be pocketed in the back part of the room. Put your register as far away from the outlet as you can and the hot air, in making its way to the outlet, will force the cold air out first.

### FURNACE CONTRACT SHOULD BE LET EARLY

It is a fallacy for a man to suppose that he can wait till his house is nearly finished before he places his furnace contract and then get good results.

The furnace contract should be let before the excavation for the foundation is begun. As soon as the contract is let the engineer should take the blue prints or tracings of them and lay off on them the entire plan. The location of the furnace, the smoke pipe, the leader pipes from furnace to first floor register boxes and stack foot-pieces, the stacks, floor-runs, if any, and second floor registers should all be shown. The size of every pipe, stack and register should be given. Then these plans should be gone over with the owner to see that the location of the registers does not interfere with his plans for arrangement of furniture. This settled, copies of these plans should be given to the building contractor with instructions that as the building progresses openings for pipes are to be left as shown on plans, and that plumbers, electricians and other contractors are not to use these openings nor obstruct the access thereto.

The first clause in the furnace contract should provide that the building contractor is to observe the specifications and plans of the heating engineer the same as he does the specifications and plans of the architect.

It is a fallacy for a man to suppose he can give the building contractor the contract for putting in the wall stacks and registers, and then, at any time, have a "furnace man" put in a furnace that will heat the house. When I am called on to put a furnace in a house where the pipes were put in by the building contractor I always agree to guarantee those rooms with which I make connections, but tell the party he must go to his building contractor for a guarantee on the rooms for which he put in the pipes.

It is a fallacy to suppose that you can put in a furnace on plans provided by the average architect and afford to guarantee the job. The shoemaker should stick to his last and the architect should stick to his architecture. Not one architect in a hundred has a thorough theoretical knowledge of heating and ventilation, and probably less than one in a thousand has any practical knowledge on the subject. Both theoretical and practical knowledge are needed to secure a successful job. When I am brought a plan on which the architect has laid out the heating work, and asked to follow his plans and specifications, I tell the party that he must go to the architect for a guarantee on the results of the architect's work.

It is a fallacy for a man to suppose that he can have his architect advertise for bids on a heating plant and let the contract to the lowest bidder and have a properly heated house.

Where this is done the man who gets the contract is the one who has based his estimate on the smallest furnace, the smallest pipes, the cheapest material and the poorest job.

When a test is made he sends an expert fireman, who stands over the furnace with a poker and makes it come near enough to fufilling the guarantee that the purchaser thinks it better to pay than have a law suit.

And from that time on the purchaser has troubles of his own. And he tells all his friends and neighbors that if they ever build they should put in steam or hot water. Hot air is a failure; he knows, for he has a hot-air furnace in his own house.

It is a fallacy to suppose that any old pipe of any old size put together in any old way will carry hot air. The force that carries hot air through a pipe is not sufficient to overcome any considerable resistance. Every care should be taken to reduce friction to the lowest point, to avoid to avoid eddies and prevent rebound from having the air strike a surface at right angles to its course. When the pipe is long greater size must be given to make up for the lower velocity. Two 45-degree angles are better than one 90-degree elbow, especially if put at a considerable distance apart. In the language of Gladstone, modified to fit the case, it is the province of the heating engineer to make it as easy as possible for the air to pass through the pipes and as difficult as possible for it to refuse to do so.

It is a fad for people in furnace-heated houses to open windows in order to get fresh air. People have an idea that air is not pure unless it is cold, and that unless they can feel a cold draft on the back of their necks they are not getting ventilation. I once overheard a lady remark in church:

"No, I don't think the church is too warm, but there is not a window open, and we shall die for want of air."

And I knew that at that very minute the furnaces were pumping in over three thousand cubic feet a minute of fresh air from out of doors.

These people remind me of the traveler who when stopping at a hotel woke up nearly suffocated, but slept sweetly till morning after he had broken a window—into a book-case—in order to get fresh air.

A house heated by hot air needs no ventilation but what the furnacee gives it. If the house is too warm cut down the fire.

It is a fad to talk about furnace heat as a "dry heat." Heat not being a substance is never either wet or dry. Air when heated becomes "drier," that is, its capacity to absorb moisture is increased. But it is the heating of the air that makes it drier and not the method by which it is heated. It makes no difference in this respect whether the air is heated by contact with the iron in a furnace, or the iron in a radiator, or the iron of a stove.

If people want moist air, make provision for moistening it, but I always wonder why the wise physicians who talk about the injury to the lungs from the "dry air of furnace-heated houses" send their patients with lung trouble to recover in "the pure dry air of Colorado and Arizona."

It is a fallacy to suppose that if a furnace heats a house it is necessarily a good furnace, and if it does not it is necessarily a bad furnace. Given two furnaces which can each deliver at the casing top the same number of cubic feet of air per minute, at the same temperature, one may be a good furnace and the other a bad one, but one will heat a house as well as the other. They may differ in fuel consumption, in cleanliness, in case of management, in durability and in many other points, but in the ability to heat the house there will be no difference.

A furnace is a machine for the manufacture of hot air. That is all it is made to do and all it can do. The problem of manufacturing this hot air with the least expenditure of fuel, the problem of producing a machine for the manufacture of hot air which shall be cleanly, easy of management and durable are problems for the furnace manufacturer. But the problem of getting this hot air equally distributed through the various rooms of a house, and so properly heating the house, is a problem that rests solely with the heating and ventilating engineer. Given a furnace, good or bad, which can produce the requisite quantity of hot air at the requisite temperature and the proper heating of the house depends wholly on the hot-air pipes and ventilating arrangements.

The poorest furnace ever built, if large enough to furnish the requisite quantity of hot air, will heat any house if the engineering work is properly done.

The best furnace ever built will not heat two rooms if the engineering work has not been properly done.

It is the proposition of the man behind the gun.

This accounts for the fact that you will often find two men, using the same make of furnace, one of whom will declare it is the best in the world and the other is equally sure it is the worst. One is giving the furnace credit that belongs to the engineer; the other is placing on it blame which is due to the engineer.

### UNNECESSARY TO PITCH LEADER PIPES IN BASEMENT

It is a fallacy to suppose that leader pipes in the basement must have an inclination or "pitch" of one inch to the foot in order that the hot air may flow through them.

The ascensional force of hot air (if I may be allowed to coin a word) depends on the difference in elevation between the starting point and point of delivery. It will make no difference whether the air is carried six feet perpendicularly and twelve feet horizontally, or five feet perpendicularly and twelve feet at an inclination of one inch to the foot. What you gain in the pitch you lose in the riser. If I had to take my pipes off the side of the casing I would carry the casing up to within a few inches of the joists and carry the

pipes horizontally under the joists. I would get the same total elevation by this plan as with a low casing and pipes inclined, but the elevation in the casing would be more efficient than in the pipes, because freer from friction.

But in practice I always use a flat-topped casing and take the pipes off the top because in this way I can make straight lines from furnace to register boxes and foot-pieces, something it is rarely possible to do where you take your pipes from the side of the casing.

By running the leader pipes horizontally and close to the joists you leave plenty of head room in the cellar, if it is of reasonable depth, and they who manage the furnace or use the cellar will rise up and call you blessed.

### A CASE IN POINT

As in this statement I am flying in the face of all tradition and precedent, I feel that I must back my assertion with a practical example.

Last year in putting in a large job I was compelled, in order to reach a certain room, to carry the air through 88 feet of pipe. Sixty-nine feet of this pipe was horizontal and 19 feet perpendicular. The lay-out was as follows:

I started with a 22-inch pipe, which I carried 5 feet perpendicularly up from casing top. Then a 22-inch 90-degree elbow. Then 5 feet horizontally to the right. Then another 22-inch 90-degree elbow. Then 42 feet horizontally through a long hallway and out into a "social room." Here the 22-inch line ended and the pipe was capped. A few feet before the end I tapped this line with a 9-inch round pipe which heated two rooms in the second story and a 3½x12 inch pipe which heated one room on first floor. Close to the end of the 22-inch line I put in a 16-inch tee collar for a 16x20 inch register on first floor. In the cap on end of the 22-inch pipe I put a 9-inch collar; on this a 9-inch 90-degree elbow, with 6 feet of 9-inch pipe running horizontally to the left. where by a reducer and 8-inch round elbow I entered a perpendicular 8-inch round stack 12 feet high. This entered the bottom of an 8x10 inch square pipe which ran 16 feet to the right horizontally between the joints. The end of this pipe was closed, and I cut into the top a 3½x14 inch pipe with a 12x15 inch register just above the baseboard.

The long run of 22-inch pipe being all exposed was leveled with a spirit level. You will notice that in addition to the 69 feet of absolutely horizontal pipe I had six 90-degree elbows, not counting the change in direction of air made as it came through the register.

You will notice also that the 16x20 inch first floor register was at the end of a 47-foot line of absolutely horizontal pipe.

In laying out this job I made the following calculations:

1. That the 5-foot rise from the top of the furnace would give sufficient force to carry the air to the end of the 22-inch horizontal line.

2. That as the capacity of the 22-inch line was considerably in excess of that of the three tappings, that the momentum of the air would, when it struck the closed end, drive a considerable amount around the 9-inch elbow, and through the 9-inch horizontal pipe, on the principle of the hydraulic ram.

3. That the 8-inch perpendicular pipe would take care of itself and give the air a good push to start it through the 16 feet of 8x10 feet horizontal pipe.

4. That by giving this 8x10 inch horizontal pipe a capacity 60 per cent. greater than that of the riser by which it was fed I would make up for the loss of velocity.

All the five registers on this system worked well, and equally well, and none better than the one at the end of 88 feet of pipe.

In my own justification I must say that I did not in this case send the air around Robin Hood's barn and back again simply to give it exercise, but because in this case the line followed was the most direct which the construction of the building permitted.

I could give plenty of other instances, and in fact every job I put in is an instance.

I freely admit that if by the use of "pitch" angles can be materially reduced or distances materialiy shortened there is an advantage, but claim it is due to reduction of angles and distance, and that this will rarely justify spoiling the head room in a basement.

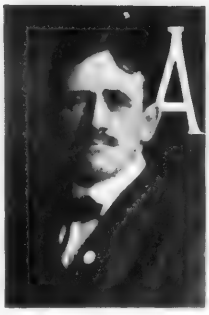
But my time and your patience would fail should I attempt to give all the fads and fallacies which in my opinion have been connected with hot-air heating. The business has been far too largely left to unscientific men. Every man who has ever lived in a furnace-heated house thinks he knows all about heating with hot air. Every man who can handle a hammer and pair of snips thinks he is competent to put in a furnace. The popular impression has been that science and skill were not needed, and if the house were not heated it was the fault of the furnace or the system.

We are as yet but in the infancy of the business. Sufficient data has not yet been obtained to reduce it to an exact science. In fact, as yet it can hardly be called a science at all. It is not strange that many believe that cheapness in first cost is the only thing the hot-air system has to commend it, and that cheapness in first cost is the only thing to be considered in having a hot-air plant installed.

# Wall Radiators vs. Long Pipe Coils

By J. A. Donnelly

(*Member of the Society*)



J. A. DONNELLY

ALTHOUGH the use of wall radiators in place of pipe coils has been advocated quite broadly by manufacturers, they have been mainly used only in place of short coils. A prejudice seems to exist against the use of long radiators and coils that is not warranted by the facts in two-pipe steam work.

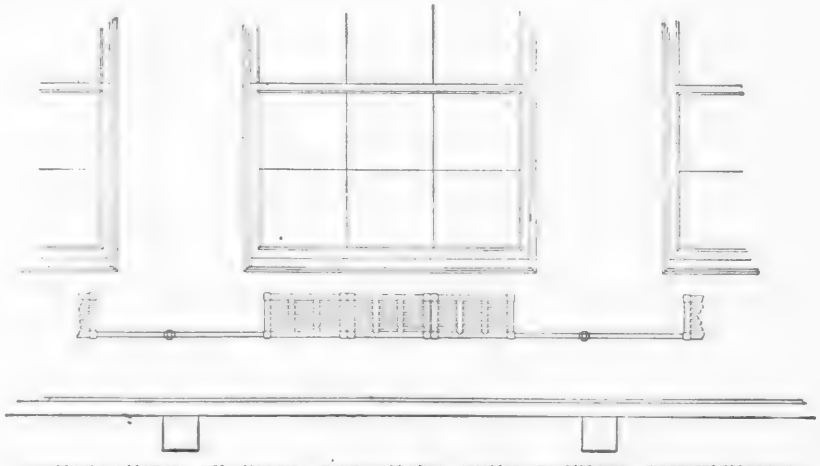
A FACTORY BUILDING CONSIDERED

It is the purpose of this paper to consider their use for heating buildings in which long coils are usually employed—such, for instance, as factory buildings of ordinary construction. Assume for this purpose a building 150x60x12 feet, with the usual amount of glass surface. Such a building will require coils of 6 1¼-inch pipes on all outside walls except the top floor, which will need from one-third to one-half more. Not less than four coils would usually be erected on each floor, and thus they would each be about 100 feet long.

The limit in length of a coil, considering only the proper circulation of steam through it, would be that each individual pipe should not have in itself more surface than good practice would warrant putting on that size pipe. Thus, a coil made of 1-inch pipe 120 feet long would have 40 square feet, and one of 1¼-inch pipe 172 feet long would have 75 square feet of heating surface in each pipe, and this would therefore be about the limit of length if that were the only factor. The easy control of the proper heating of each floor should, however, be taken into consideration; and this of itself seldom warrants coils exceeding 100 feet in length, and therefore this has usually been considered as the limit of good practice.

In regard to the comparative lengths of time required in the heating of long and short coils and large and small radiators, some misconception seems to exist, and a preference is usually expressed in favor of short coils and small radiators.

It may ordinarily be considered that a 100-square foot radiator or coil will require the introduction of about two cubic feet of steam to displace the air contained in it and about four hundred cubic feet to supply the heat units absorbed by the specific heat of the iron in the initial heating. It will thus be seen that the displacing of the air may be considered a negligible quantity, and that if the effective area of the supply pipes is directly proportional to the sizes that a large radiating unit will heat as quickly as a small one. The same fact will hold as between a long and a short coil, if the length is within proper limits, as the time required for heating is governed to such a large extent by the quantity of steam



INSTALLATION OF WALL RADIATORS WITH BOTTOM CONNECTIONS

required and affected to such a small extent by the distance the steam must travel.

Wall radiators to be used in place of long pipe coils are usually made up in groups of several sections, and the several groups may be connected with one connection at the bottom or with a connection at both top and bottom, as they work equally well either way. The limit of the length will then be the amount of radiation that the passage through the radiators is capable of properly supplying; thus, for wall radiators to be used in place of a six-branch 1¼-inch pipe coil 100 feet long, 260 square feet of surface, two 1½ or one 2-inch connection should be used.

Very many factories are built with 10-foot bays and windows about 7 feet wide, and the accompanying table has been prepared to show the number and size of wall-radiator sections that would be required to give the same amount of rated surface as that which is contained in the pipe coils in the corresponding columns.

Thus, to take the place of six 1¼-inch pipes three 9-foot sections would be required in each bay. This would make a group 6 feet long and 13 inches high if the sections were placed on their sides—probably the preferable way—or 3 feet 3 inches long and 2 feet high if the sections were placed on their ends, which might be desirable if the wall space was to be left as free as possible of heating pipes.

This substitution of wall radiators for pipe coils, aside from any argument as to the relative efficiency of each under ordinary conditions or under the conditions of special tests, is many times preferred by the factory designer, and should be by the heating engineer, as it concentrates the heating surfaces under the windows and leaves a larger amount of wall surface free for other purposes, both of which are very desirable features. The total amount of wall surface occupied by the wall radiation is also less than one-half that occupied by the pipe coils.

Where ceilings are extremely high, or glass surfaces in windows or skylights are unusually large, it is often possible to use wall radiation when it is impossible to get enough surface in pipe coils under windows of the usual factory height of 36 inches.

RELATIVE SURFACE IN PIPE COILS AND WALL RADIATORS.

| Size and Number of Pipes in Coils 10 Feet Long. | | | | | | | Size and Number of Radiator Sections. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-inch. | | 1¼-inch. | | 1½-inch. | | 2-inch. | | | | |
| No. of Pipes. | Sq. feet. | No. of Pipes. | Sq. feet. | No. of Pipes. | Sq. feet. | No. of Pipes. | Sq. feet. | No. of Sec. | Surface in each Section. | Total Surface. Sq. feet. |
| 3...10 | | | | 2...10 | | | | 2...5 | feet | 10 |
| 4...13¼ | | 3...13 | | | | 2...12½ | | 2...6 | " | 12 |
| 5...16⅔ | | | | 3...15 | | | | 3...5 | " | 15 |
| | | 4...17⅓ | | | | 3...19 | | 3...6 | " | 18 |
| 6...20 | | 5...21⅔ | | 4...20 | | | | 3...7 | " | 21 |
| 7...23⅓ | | | | 5...25 | | 4...25 | | 4...6 | " | 24 |
| 8...26⅔ | | 6...26 | | | | | | 3...9 | " | 27 |
| 9...30 | | 7...30⅓ | | 5...30 | | 5...31 | | 5...6 | " on end | 30 |
| 10...33⅓ | | 8...34⅔ | | 7...35 | | | | 5...7 | " " " | 35 |
| 11...36⅔ | | 9...39 | | | | 6...37½ | | 4...9 | " " " | 36 |
| 12...40 | | 10...43 | | 8...40 | | | | 6...7 | " " " | 42 |
| 14...46⅔ | | | | 9...45 | | 6...44 | | 5...9 | " " " | 45 |
| 15...50 | | 11...47⅔ | | 10...50 | | 8...50 | | 7...7 | " " " | 49 |
| 16...53⅓ | | 12...52 | | 11...56 | | 9...56 | | 6...9 | " " " | 54 |
| 18...60 | | 14...60⅔ | | 12...60 | | 10...62½ | | 7...9 | " " " | 63 |
| 22...73⅓ | | 17...74 | | 14...70 | | 12...75 | | 8...9 | " " " | 72 |

The most effective way of making the pipe connections between the several groups is by using a good grade of unions, as the pipes and radiator tappings may not be straight and the unions allow in some measure for correcting this. They may be connected by right and left threads, but it is a difficult connection to make. Probably an improvement in this respect would be effected by furnishing special glands with a round face upon the end that is to be bolted to the radiators and a pipe thread upon the other end.

In regard to the comparative cost, the wall radiators erected in place usually cost less than the coils, though this is affected greatly by the variance in the cost of pipe and labor.

# An Improved Application of Hot-Air Heating

By A. O. Jones

(*Member of the Society*)

A. O. JONES

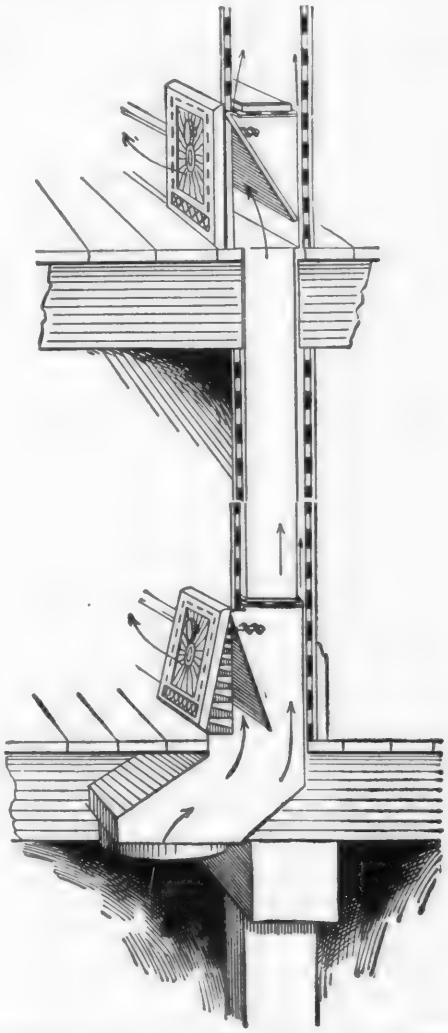
AN improved warm-air heating system which has rendered modern furnace work less complicated—an ever increasing number of practical and perfectly working heating plants—make it possible to describe a thoroughly tested and practical heating system; a system insuring the greatest amount of heat from a given quantity of fuel, and one enabling the operator to control the supply of warm air, directing it at will into the rooms to be heated, securing ventilation at a small expense and reducing the cost of installing warm-air furnaces, at the same time increasing their efficiency, is, in the writer's estimation, and in the face of rapidly disappearing prejudices, a system worthy of universal adoption.

The system under consideration differs from those in common use in that ventilation is secured in all rooms and the basement is not filled with warm-air pipes, but consists of the placing of any modern warm-air furnace of the correct size in an ordinary basement of reasonable height. The furnace to be centrally located and supplied with fresh air of an amount equal to at least 90 per cent. of the combined area of the basement pipes, and the warm-air chamber connected by one-half the number of warm-air pipes ordinarily used to improve warm-air registers placed in the wall of each room on the first floor, with a wall pipe continuing from the top of each register box to the rooms on the second floor, using for heating each two rooms—one on the first floor and one on the second—a basement pipe with capacity equal to the capacity of two pipes necessary for heating these two rooms separately. The manner of connecting the wall pipe to the top of the improved side wall register is shown in the illustration; also the method of pipe construction in the basement.

The advantages to be gained are that ventilation is secured in all the rooms, as these registers are provided with a double metal box, arranged with an air space between the inner and outer casing, and a ventilating opening, where air is drawn out of the rooms being heated and is conducted through the air space upwards, around the wall pipe—if single wall pipes are used—or through the space between the two casings of a double wall pipe when the latter are used.

The heat of the wall pipe causing an upward current insures a rapid movement of the foul air to a point in the attic directly above the registers, where it should be conducted through vent pipes to a chimney flue not used for any other purpose.

It will be seen that cellar air—as ordinarily used for protection when double wall pipes are used—is not allowed to enter the space between the two casings of the wall pipe, but, instead, air is drawn



IMPROVED TYPE OF SIDE WALL REGISTER FOR FIRST-FLOOR ROOMS

from the rooms; therefore, coal dust and fine ashes are not found escaping through the registers, as is sometimes the case with the systems that have been used before the introduction of this system, which has been adopted by a great many furnace dealers who testify to the practicability of the system described.

The advantages of being able to utilize all of the warm air from the furnace in the first floor rooms when the second floor rooms are not in use should not be overlooked, for as is well known—with the old plan of installation—the closing of the second floor registers or the dampers in the pipes leading to the second floor registers, does not increase the amount of air delivered to the first floor rooms, but simply causes the air to be overheated, which is very objectionable—often giving rise to the argument which is advanced regarding vitiated air. While with this improved system the full amount of the air supply is constantly moving, and when the second floor rooms are not in use the fire in the furnace must necessarily be checked and a larger amount of air is supplied at a lower temperature.

When the second floor rooms are in use the increased velocity of the air in the perpendicular or wall pipes makes it possible to heat rooms on the first floor located some distance from the furnace, which is difficult without the assistance of the suction caused by the wall pipe.

The reduced number of warm-air pipes in the basement makes it possible to connect the larger warm-air conductor at a point on the bonnet of the casings where it can run straight to the register. This makes angles unnecessary, excepting in rare cases, and as a straight line is the shortest distance between two given points, the least possible amount of piping is used with very few angles; therefore the friction and radiation are reduced to a minimum, which means cooler basements and warmer living rooms, to say nothing of the reduction of cost in installation.

This system, therefore, renders modern furnace work less complicated, insures perfectly working warm-air heating plants, securing the greatest possible amount of warm air from a given quantity of fuel, reduces the cost of installing furnaces, and makes failure almost impossible.

## Preliminary Report of Committee to Secure Data on Hot Water Heating

One of the interesting reports presented at the summer meeting of the Heating Engineers' Society is that on the subject of hot water heating.

In its report the committee, which is made up of James Mackay, Ed. F. Capron and S. R. Lewis, states that it has sent out a large number of inquiries and has received very interesting replies. More inquiries will be sent out from time to time. The subject naturally divides itself into three heads, boilers, radiation, piping. The report continues:

BOILERS

We have had poor success in getting data from the boiler manufacturers because many of them naturally, perhaps, believe that in answering our questions they will be divulging private and valuable information, which, if made public, might injure them. The difference in quality and kinds of fuel in different parts of the country renders the situation still more difficult. We have tabulated the grate surfaces and the rated capacities of a large number of boilers of different types. We feel that data giving the average practice in proportioning grate surface to radiation capacity for the different fuels will be of value.

The committee would like all our members, and any interested parties to send us answers to the following questions:

1. What size sectional or cast-iron boiler would you use for a hot water heating apparatus, containing 2,000 sq. ft. net radiation, in addition to mains; the radiation to be maintained at a temperature of 150 degrees Fahr.?

2. What method do you use in determining the size of boiler required for a given hot water heating apparatus, involving:

(a) Direct radiation,
(b) Direct-indirect radiation,
(c) Indirect radiation?

3. In proportioning sectional or cast-iron boilers for any given work, do you accept catalog statements, or have you a method for checking grate areas, heating surfaces, flue surfaces and areas, smoke connections, etc.? If so, please give it.

We would appreciate suggestions for further progress along these lines, or other lines from the society.

RADIATION

We have taken a given room under given conditions, and sent out inquiries to engineers in this and in foreign countries. Great interest was manifested by nearly all to whom inquiries were sent. The answers are tabulated, and the most interesting methods used in arriving at them will be given.

We have worked back from the most conservative and apparently correct answers and checked up tables of heat transmission, loss, etc., etc., and expect to give an illustration of the means of getting the average result. This method, proven approximatley correct for the given case, will by means of the tables, give a method of computing the amount of required radiation for unusual conditions.

The committee would like answers to the following questions:

1. A room in a residence is to be heated by hot water, gravity circulation. Temperature of water, 160 degrees. Room is 10 ft. by 10 ft. by 10 ft., two sides exposed. Outside walls, brick 9 inches thick, furred inside. Glass in three windows, aggregate glass surface, 62 sq ft. Outside temperature, zero. Maximum permissible drop in tem-

perature of water, 20 degrees. Please state amount of direct radiation required if room is to be heated by direct only, and give method used.

2. Please state amount of indirect radiation required if room is to be heated by indirect only; indirect to be suspended from basement ceiling with outside air supply, and give method used?

We would be glad of suggestions for further data on this subject than that above outlined.

PIPING

We have made a large number of inquiries of engineers and contractors in regular practice in installing hot water plants. These inquiries cover the sizes of mains and connections, the best of the various systems for given conditions, etc.

A list of questions covering the matter of mains is given here. The committee would appreciate answers to all, or any of them.

What is your usual practice in laying out work as follows: Usual size of main supply pipe at boiler supplying 1,800 square feet. Direct radiation, three-story building:

(a) With two pipe circulation, 120 feet circuit,

(b) With one pipe circulation, 100 feet circuit,

(c) With overhead circulation, closed system, 120 feet circuit,

(d) With overhead circulation, open system?

Usual size of pipe supplying 1,200 square feet of indirect radiation; bottom of radiator 12 inches above top of boiler:

(a) With connection direct from boiler to radiator?

(b) With overhead circulation, supply pipe runing to header?

Is it your usual custom to run supply to indirects direct from boiler, or make connection with basement main, feeding direct radiators above?

Have you noticed any different results in above connections?

Usual size of risers feeding direct radiation 80 square feet. 1st floor: 90 square feet. 2nd floor: 60 square feet. 3d floor: 10 feet ceilings.

(a) With up-faced circulation having separate return pipe?

(b) With overhead circulation, one pipe?

Usual size of riser supplying 80 square feet direct radiation, 2nd floor: 10 feet ceilings.

(a) With up-feed circulation having separate return pipe?

(b) With overhead circulation, one pipe?

Usual size of direct radiator connections, 1st floor,

(a) 30 square feet and under?

(b) Not exceeding 60 square feet?

Usual size direct radiator connections, 1st floor,

(a) Not exceeding 100 square feet?

(b) 100 square feet and over?

Usual size direct radiator connections, 2nd floor,

(a) 30 square feet and under,

(b) Not exceeding 60 square feet?

(c) Not exceeding 100 square feet?

(d) 100 square feet and over?

Usual size direct radiator connections, 3rd floor,

(a) 30 square feet and under,

(b) Not exceeding 60 square feet?

(c) Not exceeding 100 square feet?

(d) 100 square feet and over?

We have worked five months on this very interesting subject, and while we expect to have a report at the annual meeting, we wish to be sure we are working on the lines, intended by the society at the time of our appointment.

We desire your suggestions and criticism on the above outlined program, and further desire any information which any member may have to suggest along the lines of our researches.

## The Abuse of Valves

In a comprehensive article on this subject, *The Valve World*, in a recent issue, after exonerating the manufacturer from oft-repeated complaints regarding defective valves, gives the following reasons for their leaking, after they are placed in a pipe line:

1. The improper use of cement and the failure to remove particles of cement, scale, chips, dirt, etc., that naturally get into the pipe.

2. That the threads on pipes are often cut longer or smaller than standard.

3. The application of a pipe wrench, especially in the case of light valves, on that end of the valve opposite the one which is being screwed on the pipe.

4. The failure to clamp lengthwise a light valve which is put into the vise for the purpose of removing the centerpiece.

5. The endeavoring of a steam fitter to stop the leak of a stuffing box by straining it with a large wrench when the difficulty is due to the packing having become worn out and needing to be renewed.

6. When a valve is to be used on a header, the steam fitter sometimes starts out with a long piece of pipe which is unsupported, and, through carelessness, allows the strain of the pipe to come on the valve, thereby springing it.

7. The failure to make proper allowance for expansion and contraction, allowing the strain to be thrown on the valves.

8. The undertaking to tighten a leaking valve by using some kind of a lever on the wheel, a course which seldom fails to materially injure the valve.

THE HEATING AND VENTILATING MAGAZINE

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IF further justification were needed for the existence of journals engaged in promoting the science of heating and ventilation, it would be furnished in a report on the heating and ventilating plants of New York city's public schools, recently submitted to the Board of Education by Mr. C. B. J. Snyder, chief architect and superintendent of public school buildings. In this report the very significant statement is made that the extraordinary development seen in the manufacture and installation of electrical machinery, is also to be found in the design of ventilating systems—so much so that a ventilating plant designed a dozen years ago and considered, at that time, as fulfilling the requirements of good practice, is now adjudged quite obsolete. Taking present-day practice as a criterion, the report goes on to state that of the 562 public school buildings in New York City, one-half of which are mechanically ventilated, the systems in only 157 can be considered as good, 61 are fair and 344 bad. In other words, it would appear that the rank of the system may generally be determined by the date of its installation, the older systems, in every case, being classed as bad.

Not only this, but the report leaves the impression that the coming decade will witness still further developments in the advance of heating and ventilation which may be sufficiently extensive as to discount much of the present-day practice.

Under these circumstances, heating engineers will continue to maintain a lively interest in all that appears in print that has to do with the advancement of the science, and the technical press, on the other hand, may be expected to serve for many years to come as a medium for communicating both information and ideas on this subject to the entire trade.

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IN this connection, it is notable with what degree of caution heating engineers express their opinions upon most subjects connected with their profession. In a paper on furnace heating, read before the midsummer meeting of the heating engineers this month, the author, Mr. R. S. Thompson, in advancing many theories, some of which are at wide variance with generally accepted notions, takes characteristic pains to mention distinctly that he prefaces his statements throughout with an "it is my opinion that." The paper itself, by the way, serves as an excellent example of the points we have discussed and in the radical stand taken on methods of furnace heating, the author quite rivals, if he does not eclipse, his previous paper on a similar subject read at last year's summer meeting of the heating engineers.

IT was to be expected that so large an increase in membership in the National Master Steam Fitters' Association, made up, as it was, largely from men in the Middle West, would have its effect in shaping the future policy of the association. It takes a national convention, however, to fully bring to a realization the fact that while the addition of new members strengthens the organization, at the same time it entitles them to full votes, together with the other prerogatives enjoyed by members of many years' standing. The suggestion, therefore, of President Gormly that it be made the duty of an official from the national office to visit or keep in perfect or systematic touch with every local association of master fitters in the country, would not only enable the national officers to be familiar with the difficulties that arise from time to time, and to have the ability and diplomacy necessary in order to counsel wisely or to so inform them that they would be in a position to act promptly for the best interests of the members, but would serve quite as useful a purpose in acquainting the eastern members that the West may be expected to furnish ideas and advice as well as to receive them.

AN unsatisfactory state of affairs, which, if duplicated in other sections, may well have a disquieting effect on heating engineers, is reported to us from the Middle West. Upon being commissioned to design a rather elaborate ventilating system, our correspondent took pains, before working out his plans, to examine the installation at the principal hotels, theaters, schools, hosiptals and churches in Cleveland and Toledo, Ohio, and in Elgin and Chicago, Illinois. Among the buildings visited in Cleveland were the Colonial Hotel, Keith and Lyric Theaters, Central and East High Schools, Lakeside Hospital and the Pilgrims' Church; in Chicago, the inspection included the Post Office, Public Library, Swift & Company's office building and the Great Northern Hotel; in Elgin, an inspection was made of the Elgin National Watch Works. The writer found that in none of these buildings were the ventilating systems working successfully. In most cases the apparatus did not appear to be large enough, although it generally occupied the entire space available for its installation. In cases where the blower and flues were large enough, failure was due to an enormous amount of friction in the distributing ducts, owing to the fact that the architect had not included ventilation in his design. Reference was also made to inefficient methods of introducing and distributing the air into the rooms, but the writer has no hesitation in attributing the majority of failures directly to small equipments.

A STATEMENT in our last issue, regarding the use of exhaust steam for heating purposes taken from turbine generators, has aroused considerable discussion, especially on the part of those who are incredulous as to the possibility of its being accomplished successfully and with the desired gain in economy. We referred to a plant recently installed in which exhaust steam for heating was taken from turbines, and are glad to correct a statement made in this connection that the condenser planned for the system had not been used. In an early issue we shall present a detailed description of the manner in which this problem has been successfully solved in the plant referred to as well as in other instances.

## Report on the Heating and Ventilating of New York City's Public Schools

A report of the condition of the heating and ventilating systems in the public schools of New York City, recently summitted to the Board of Education by Mr. C. B. J. Snyder, superintendent of school buildings, makes interesting reading for engineers generally, who are engaged in this class of work. The report, for instance, takes up such features as the passing of what were but a few years ago considered up-to-date ventilating systems, and also the relation of the janitor-engineer to the proper operation of a heating and ventilating plant. The report says, in part:

There are 562 public school buildings in the Greater City. Our records indicate that of these 240 have the plenum system of ventilation, 36 direct-indirect, and 286 practically no means whatever of insuring a change in the air of the rooms other than by opening of the windows. Of these 157 are good, 61 fair, and 344 are bad.

It is usual to speak of the rapid progress made during the last ten years in the science and application of electricity to our many uses, but comparatively few are aware that the progress made in the science heating and ventilation—and especially the latter—during the same period is almost as remarkable, and what was considered as good practice twelve or fifteen years ago is now obsolete.

Thus it is that so large a number of our school buildings are not classed any better than "fair."

There are other causes which have operated to impair the efficiency of apparatus properly designed and installed.

### CHANGES IN THE USE OF ROOMS

As, for instance, where the building was designed for the auditorium to be used only for a few minutes in the morning, and economy of design and application demanded that the air supply should be diverted from the building during this short period and be thrown into the assembly room where the children were gathered. Development in the use of our schools now provides almost constant use of the assembly for one purpose or another, a thing that is quite proper, but which now renders good ventilation in these buildings something of a problem, as alterations are not to be easily and cheaply made.

Another source of trouble is the constant conversion into classrooms of spaces in school buildings originally designed for other purposes and which cannot, without great expense, have extended to them the ventilation which is installed and working properly in the other portions of the structure.

In both of these instances there are many misunderstandings as to causes and effects.

### HEATING SEPARATE FROM VENTILATION

In the design and operation of a ventilating plant for schools—which has come to be recognized as the introduction of thirty cubic feet of freshly warmed air per pupil per minute and the removal of the foul or vitiated air (the result of breathing and exhalations from the body and clothing)—engineers have reached the conclusion that better results can be obtained if the heating be kept separate from the ventilation.

This permits of sending the air into a classroom at not over seventy-one or seventy-two degrees, a temperature at which it has not lost its freshness, so to speak, as it does by having been passed over highly treated surfaces to bring it up to ninety or one hundred and ten degrees to heat as well as ventilate a school room.

This constant inflow of fresh air at a temperature of seventy-one degrees, which is pleasant to the occupants, is quite sufficient for the heating of the room in mild weather, but if not, then the air of the room may be brought to any desired temperature by the use of the direct radiation placed under the windows.

As buildings were made larger and larger and more and more complicated, engineers found it necessary to have some sort of automatic control of the heat supply, as hand control, whereby the temperature of the air coming into the room could be changed at will by the teacher, was found to be an utter failure.

### NEED OF AUTOMATIC CONTROL

This was and is due primarily to that property of the human body that permits of a gradual rise in temperature of that in which it may be immersed to many degrees above the normal without sounding any sharp warning. It is no unusual thing to enter a classroom and find that both teacher and pupils are unaware that the temperature is upwards of eighty degrees.

Automatic temperature regulation was therefore developed and is now used on all work, both public and private, throughout the country, where any attention is to be paid to the securing of an equable temperature in the building, not necessarily to be ventilated, but also for heating purposes only, as in hotels and office buildings. The apparatus is expensive to install and maintain, but if properly used pays large returns on the investment through the saving in the consumption of fuel alone, irrespective of the benefit derived by the occupants of the building.

This is the only portion of the heating and ventilating plants installed during the last ten years in our schools which is covered by patents, my policy having been to keep clear of patented systems. As the instruments are delicate and not readily understood, the company, as a matter of self-protection, has looked after them to quite an extent and without charge.

This was discontinued almost wholly during the last fall and early winter without notice to this office, and was first made evident by the complaints received and repairs and adjustments to be made. The aggregate running over a thousand dollars,

decision was made to advertise. Not only did this take time, but other complications also arose which brought forth more complaints in a few short weeks than had been heard in the last twelve years.

The results of the agitation will be found to be wholly beneficial, for it will be demonstrated beyond dispute that the installations designed by our engineer, Mr. F. G. McCann, who obtained his degree of M. E. in the Massachusetts School of Technology, are correct and adequate, and measures will be taken for their proper use.

OPERATING ENGINEERS LACK KNOWLEDGE OF SYSTEMS

To the lay mind the word "Engineer" is something to conjure with, and there is no proper appreciaton of the difference between a designing engineer and the engineer who may be employed to look after the operation of a mechanical plant.

The first is the man who plans, invents and designs, a man of technical education; the second may also have all of these qualifications, but more often and unfortunately he has not. The question of ventilation is not understood by others than those who have made a close study of it, and were we to demand of the Municipal Civil Service Commission that, as one of the qualifications requisite to appointment, our janitor-engineers should have a good practical knowledge of the subject, our lists would be bare.

Every operating engineer, however, has the mechanical instinct strongly developed, and with proper instruction it would be but a marvelously short time before he would grasp the fundamentals and soon prove himself competent on this point.

And right here has been one of the great troubles we have had to contend with.

It is safe to say that, out of two hundred janitors employed, not more than one ever saw a modern ventilating plant or knew anything of the relative importance of seventy degrees temperature, accustomed as they are to anywhere from ninety to one hundred and thirty-five degrees. Therefore, the eighty degrees which saps the energy of the pupil and teacher is cool and enjoyable to him by contrast, and so it is with his firemen, be they experienced men.

A private corporation of one-tenth that of our public school system, having this problem to deal with, would forthwith start its own school of instruction, through which all new men must pass before they be entrusted with a plant to operate. This the Committee on Care of Buildings has begun in a small way, but it should have the encouragement and approval of this Board to deal with the problem broadly and practically.

Approval should also be extended to its intent to have at least four janitor-engineers to look after the work of the janitors now employed.

Objection has been made that this is unnecessary, since the principal of the school can see that the janitor's work is properly performed. This is true only as relates to the cleanliness of the building, but there are, necessarily, but very few principals who are competent to judge of the economical operation of a mechanical plant. Just as soon as the Committee on Care of Buildings puts this into operation the benefits will be found to be so great, not only through the enforcement of economy in the use of coal and supplies, but also as to increased efficiency, that it will be extended to its proper proportions.

It is preposterous to think that one man could look after the six hundred janitors employed by the Board.

We have reason to believe that the work designed and installed under the direction of this Bureau is correct, but since the question has been raised I should never be content until it had been passed upon by qualified consulting engineers employed for the purpose, so that we can obtain their unbiassed judgment—not simply complimentary interchange of professional courtesies.

I therefore most earnestly recommend that the Board give to the proposition of the Committee on Buildings its approval for the employment of such as it may deem necessary. I have made this recommendation to that Committee, naming two men, both of the very highest standing in this particular branch of the profession, each from a different part of our country.

Upon the receipt of the report of these two men we will know what is to be done with the work now in preparation and for the future.

As a result of Mr. Snyder's report, Professor S. H. Woodbridge, of the Massachusetts Institute of Technology, and Professor R. C. Carpenter, of Cornell University, have been engaged to go over plans and specifications for some of the latest plants designed by the Board, and to send on their reports upon them. In this way it is believed that it will be possible to arrive at practically an exact knowledge as to whether or not the present practice in the heating and ventilating of the New York city school buildings can be still further developed.

**Back Numbers Wanted**

Owing to the unusual demand for our March (1906) issue, we are in need of extra copies of this number, and will pay 10 cents cash for each copy sent us. Address THE HEATING & VENTILATING MAGAZINE, 1123 Broadway, New York.

**F. A. Clegg & Co.**, Louisville, Ky., heating and ventilating the National Cash Register Company's building at Dayton, Ohio.

### Among the Supply Trade at the Master Fitters' Convention

**A. A. Griffing Iron Co.,** Jersey City, N. J., was worthily represented by W. C. Cosgrove and A. S. Mappett, who greeted many old friends while they did the honors for the Bundy line.

**American Radiator Co.,** Chicago, Ill., was well represented by Charles K. Foster, George E. Downe and H. I. Lord of the Chicago office; Frank Howell of the New York office, and E. F. Glore of Philadelphia, all of whom had something interesting to say regarding the company's line of ideal boilers and American radiators.

**J. L. Mott Iron Works,** New York, and the company's line of Sunray boilers and Roman radiators were kept well to the front by J. J. Blackmore and J. Lucas.

**Walworth Manufacturing Co.,** Boston, Mass., was among those whose pencil souvenirs were eagerly sought for at the convention. The company was represented by George E. Coppins and Edmund B. Keane. Mr. Coppins announced that the design of a diamond with the word "Stillson" within it has been registered as a trade mark under the new trade mark law, so that no one will be deceived in purchasing a wrench purporting to be a genuine Stillson. The genuine Stillson wrench will hereafter always bear this trade mark.

**Garwood Foundry and Machine Co.,** Garwood, N. J., through J. B. Bernhard, exhibited a Bernhard boiler which aroused much interest on the part of many to whom its operation was explained. Mr. Bernhard is enthusiastic over the favorable results of the tests to which his boiler has been put during the past winter.

**John Simmons Co.,** New York, sent an appropriate reminder of the firm's line of supplies in the shape of a souvenir pencil made of a miniature length of pipe. The company was represented by Daniel Bridges and W. G. Hawes.

**Warren Webster & Co.,** Camden, N. J., was represented by Warren Webster and James H. Davis, of Chicago, both of whom were kept busy greeting friends and pointing out the advantages of the Webster system of heating.

**Fowler & Wolfe Manufacturing Co.,** Philadelphia, Pa., was in evidence through the many installations of the company's wall radiation in Atlantic City. Mr. Wiltsie F. Wolfe, president of the firm, was a familiar figure at the convention.

**H. W. Johns-Manville Co.,** New York, had an interesting exhibit of pipe covering and its souvenirs of crude asbestos were much sought after. The company was represented by F. R. Austin, C. H. Tower and W. A. S. Clarke.

**Pierce, Butler & Pierce Manufacturing Co.,** Syracuse, N. Y., maintained its reputation for originality in the matter of souvenirs by distributing a handsome watch fob containing a tiny circular thermometer. The company's souvenir of a watch, at the last convention, is well remembered. P. M. Beecher, of Syracuse, and E. C. Molby, of the New York office, and E. H. Giles, of the Philadelphia branch, had their hands full to meet the demand for these souvenirs.

**J. O'Meara, Inc.,** New York, was represented by J. O'Meara who was kept busy replying to the congratulations of his friends on the new line of steam fitting specialties he has placed on the market.

**James A. Donnelly,** New York, was on hand in the interest of his vacuum steam heating system.

**Hart & Crouse Co.,** Utica, N. Y., was in evidence in the person of William M Mackay, of the New York office, who had many calls for information regarding the summer meeting of the Heating Engineers' Society, July 19–20, as well as in connection with the superior qualities of Royal Heaters and New York radiators.

**McNab & Harlin Mfg. Co.,** New York, was represented by John J. Quinlan, who renewed many old acquaintances.

**Gurney Heater Mfg. Co.,** Boston, Mass., reminded its many friends of the Bright Idea and Gurney boilers through its Philadelphia representative, George C. Boose, who did the honors for the house.

**Among** the other firms represented were: Hoefer Manufacturing Co., Freeport, Ill., represented by Fred B. Browning; Norwall Manufacturing Co., Chicago, Ill., George D. Hoffman and D. E. S. Storm; Stoever Foundry and Manufacturing Co., Meyerstown, Pa., A. A. Schaefer; E. P. Allen Valve Co., Chicago, Ill., E. P. Allen and S. S. Brewer; Model Heating Co., Philadelphia, Pa., E. H. Fisher, V. H. Seward and Homer Addams; Utica Heater Co., Utica, N. Y., C. E. Hodges and W. J. Jones; Brogan and Co., Philadelphia, Pa., James J. Brogan; Honeywell Heating Specialty Co., Wabash, Ind., M. C. Honeywell; United States Heater Co., Detroit, Mich., R. C. Kriebel; Isaac A. Sheppard & Co., Philadelphia, Pa., George W. Barr; Penn Engineering Co., Philadelphia, Pa., H. H. Hellerman; American Blower Co., Detroit, Mich., Charles E. Lawrence; Magee Furnace Co., Boston, Mass., Lyman H. Norton and E. N. Cokefair; Central Radiator Co., New York, Robert K. Story; National Radiator Co., Johnstown, Pa., John H. Waters; National Regulator Co., Chicago, Ill., Herbert A. Joslin; Smith & Thayer Co., Boston, Mass., T. Howell Johnson; McCrum-Howell Co., New York, President L. G. McCrum, Secretary, Howard T. Gates, W. H. Smith, F. A. Brandow and E. E. Fox; H. B. Smith Co., Westfield, Mass., Richard Reed, J. C. Faulkner, H. J. Walther and F. B. Miller; Jenkins Bros., New York, H. G. Logan, Thomas Martin, J. D. Stiles, J. H. Williams, Charles Jackson, A. C. Langston and William J. LeCompte; Richardson & Boynton Co., New York, H. L. Anness, M. B. Moore and

W. E. Jacobus; United States Radiator Co., Dunkirk, N. Y., Harry S. Martin, W. C. Marsh, N. E. Gould, M. E. Danforth and W. S. Appleton; Thatcher Furnace Co., New York, A. L. DeVoe; Kinnear Pressed Radiator Co., Pittsburg, Pa., Raymond H. Kinnear and L. H. Quackenboss; Herendeen Manufacturing Co., Geneva, N. Y., F. W. Herendeen; Walker & Pratt, Boston, Mass., Charles Morrison; Vapor Heating Co., Philadelphia, Pa., J. J. McKenna; Eaton, Cole & Burnham Co., New York, George E. Walton; Lawler Regulator Co., New York, James J. Lawler and Charles H. Hobson; Isaac Coffin Co., Boston, Mass., J. P. Gallivan; Abendroth Bros., Port Chester, N. Y., Lew Moore; Prizer-Painter Stove and Heater Co., Reading, Pa., Howard Hovey and W. S. Newkirk; Loew Manufacturing Co., Cleveland, Ohio, E. Croft and C. E. Smark; Keasbey & Mattison, New York, Charles S. Wood and Nelson S. Wood; Ashton Valve Co., Boston, Mass., Frank J. Corbett; Philip Carey Manufacturing Co., Philadelphia, Pa., J. P. Colladay; Monash-Younker Co., Chicago, Ill., Mark Monash and L. P. Monash; Norristown Covering Co., Norristown, Pa., C. M. Stokes; H. Belfield & Co., Philadelphia, Pa., George Walton, Robert A. Keasbey Co., New York, Harding Benedict; Camden Potteries Co., Camden, N. J., T. Monroe Dobbins; William H. Page Boiler Co., Philadelphia, Pa., Arthur F. Sawyer; H. Mueller Manufacturing Co., Decatur, Ill., Fred B. Mueller and William F. McCarthy; Nye Tool and Machine Works, Chicago, Ill., John M. Peoples; Canfield Supply Co., Kingston, N. Y., P. A. Canfield; Johnstown Supply House, Johnstown, Pa., John K. Flinn; C. J. Rainear, Philadelphia, Pa., C. W. Rainear; American Blower Co., Detroit, Mich., Charles D. Lawrence; Thomas F. Cushing Co., New York, Thomas F. Cushing and the Sprague Electric Co., New York, Harry G. Issertell.

### The Fair Sex Was Well Represented at the Convention

Among the ladies present at the Master Steam Fitters' Convention were: Mrs. Stewart A. Jellett and Miss Theodora Jellett, Philadelphia, Pa.; Mrs. Robert Ernst, Detroit, Mich.; Mrs. William A. Davis, New York; Miss Davis, New York; Miss E. M. Bailey, Washington, D. C.; Miss M. D. Ellison and Miss F. M. Ellison, Washington, D. C.; Mrs. W. W. Biggs, Washington, D. C.; Mrs. Richard Hankin, New York; Mrs. W. H. McCuen, Washington, D. C.; Mrs. George H. Zellers and the Misses Zellers, Washington, D. C.; Mrs. H. B. Gombers, New York, and Miss L. B. Blackwood, New York; Mrs. John K. Allen, Chicago, Ill.; Mrs. C. M. Stokes, Norristown, Pa.; Mrs. William M. Mackay and Miss Mackay, New York; Mrs. E. J. Ryan and Miss Ryan, Danville, Ill.; Mrs. A. C. Higgins and Miss Higgins, Washington, D. C.; Miss Rutzler, New York; Miss Smith, New York; Mrs. M. G. Sellers and Mrs. W. J. Sellers, Philadelphia, Pa.; Mrs. A. R. Hesske and the Misses Hesske; Mrs. W. M. Whitlock, Newark, N. J.; Mrs. E. N. Cokefair, New York; Mrs. C. C. Pyke, Lafayette, Ind.; Mrs. Henry G. Issertell, New York; Mrs. A. T. Werkhoff, Lafayette, Ind.; Mrs. A. S. Armagnac, New York; Mrs. Thomas Eagan, Washington, D. C.; Mrs. Homer Addams, Allentown, Pa.; Mrs. Frank Dobson, New York; Mrs. Lew Moore, New York; Mrs. J. B. Bernhard, New York; Mrs. J. C. Faulkner, New York; Mrs. Elmer Crawford, Chicago, Ill.; Mrs. E. H. Roberts, New York; Mrs. C. N. Brisze, New York; Mrs. B. H. Carpenter, Wilkesbarre, Pa.; Mrs. E. C. Molby, New York, and Miss Bailey.

### Bowling Match Between Golfers and Master Fitters

Through the initiative of E. C. Molby, of the Pierce, Butler & Pierce Mfg. Company, a bowling match was arranged between members of the Eastern Trade Golf Association and those of the Master Fitters' Association, who were present at the Atlantic City Convention. The Golfers' team was made up of E. C. Molby, Frank K. Chew, W. S. Cosgrove, E. H. Roberts and W. R. Watt rs. On the Steam Fitters' team were: C. N. Brisze, Frank H. Falls, William J. Baldwin, Jr., J. G. Gent and George H. Zellers. Substitutes for the third game: E. A. Monroe and H. B. Gombers. Mr. Molby acted as captain for the Golfers, while C. N. Brisze was made captain for the Steam Fitters. According to the terms of the match, the losers were to entertain the winners. The match was played Thursday night, June 21, on one of the Boardwalk alleys and was won by the Eastern Trade Golf Team. In lieu of the entertainment planned, it was agreed that a bowling tournament should be held for the ladies the following night, in which the losing Master Fitters' team should provide both prizes and a luncheon. The winners in this contest were Miss B. Zellers, Mrs. E. H. Roberts, Mrs. E. C. Molby, Miss L. B. Blackwood, Mrs. C. N. Brisze, Mrs. Thomas Eagan, Mrs. W. H. McCuen, Miss N. E. Zellers, Mrs. E. J. Febrey and Mrs. B. H. Carpenter. Luncheon was served at the Islesworth, Captain Molby acting as toastmaster. The prizes consisted of a gold locket and chain, lace parasol, Roman horseman of bronze, gold necklace, Mexican drawn work table cover, Sheffield plate card tray, gold and pearl hair comb, brooches, set of doilies and a toy bear in compensation for the lowest score.

### Slovenly Attention to Foreign Correspondence

Among the failings of American manufacturers who make some effort to obtain export business, says the *International Weekly*, there is one which is grossly neglected in consular reports, as compared with its companion faults, such as poor packing, short credits, etc. This fault, probably as detrimental as any to the progress of the export trade, is slovenly attention to export correspondence. It would seem as though a merchant who has an opportunity to open up trade relations with a new customer in some remote part of the earth would be sufficiently interested to handle his correspondence with this individual in a thorough and businesslike manner, giving adequate attention to all questions asked, and treating of business matters in terms familiar to the customer.

As a matter of fact, the number of American houses which answer their foreign letters in a manner acceptable to their foreign customers constitutes a very small proportion of the whole. The trouble may be due to the carelessness of clerks and office assistants, but this is no justification for the prevalence of the complaint.

NOT THE ONLY CHARGE

The unwillingness of American manufacturers to communicate with their foreign friends in foreign languages is by no means the only charge entered against them, though it may be the most remarkable. It is not unusual for foreign houses to write in their own language and state that they can correspond in English, if desired, which makes it permissible for the exporter to exercise his own choice. Under any other conditions, when a letter is received in Spanish, German, or French, there is every reason in the world why it should be answered in the same language, and no reason why it should not, except shiftlessness.

Another failing of the American is his negligence in the matter of explaining technical terms or trade phrases which may be well understood here, but be meaningless abroad. This applies not only to statements of terms, discounts, etc., but also to catalogue announcements which, although plain to the man who makes the goods, might be entirely without sense to the man who might buy them. Contradictory statements as between catalogue and letter are also complained of frequently, as in the case of a firm which in its catalogue makes prices f. o. b. factory, and in its letter offers export figures f. o. b. seaport. Blunt and tactless statements of terms of payment are also very much too common in the letters of exporters. In his domestic business the manufacturer would know how to be polite when refusing to extend credit, and no reason appears why he should not be equally considerate of his foreign customer's feelings.

One item of information which would always interest the buyer very largely, and which would require but a brief paragraph in any business letter, is that with reference to export packing. If the manufacturer gives particular attention to this important detail, he could make it known to his prospective customer with great advantage both to himself and to the customer.

## AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

### A New Directory Out

A new directory of the Society, together with the Constitution and By-Laws, corrected to June 15, 1906, has just been issued. A new feature to be noted is the grouping of the membership by countries and States. In this grouping 26 members are residents of foreign countries. Of the remaining 231 members New York State leads with 79. Pennsylvania comes second with 30, and Illinois and New Jersey follow with 24 and 13, respectively.

An important feature of the directory is a list of all the papers read at the Society meeting, with the names of the authors.

### New Members of the Heating Engineers' Society

The following list of newly-elected members will be announced at the mid-summer meeting of the society in Chicago, July 19-20:

MEMBERS

Eugene P. Bradley, St. Louis, Mo.
Joseph H. Brady, Kansas City, Mo.
James H. Brown, Rochester, N. Y.
Charles E. Hasey, Minneapolis, Minn.
Elbert O. Haskins, Rutherford, N. J.
George D. Hoffman, New York.
Frank E. Kerr, Chicago, Ill.
Allan G. McAvity, Montreal, Can.
D. F. Morgan, Chicago, Ill.
John Trainor, Baltimore, Md.
Champlain L. Riley, New York.
Warren Webster, Camden, N. J.
George H. Wentz, Lincoln, Neb.

ASSOCIATES

John Boylston, Chicago, Ill.
E. N. Green, Houston, Texas.

JUNIORS

Gustav A. Dornheim, New York.
Edward W. Soleau, Atlanta, Ga.

Members of the American Society of Heating and Ventilating Engineers in Chicago formed themselves into a local chapter in June, and made application to the Society for a local charter. Their application will, it is expected, be favorably acted upon at the Society's mid-summer meeting. The Chicago Chapter organized with T. J. Waters as temporary chairman and August Kehm as temporary secretary.

# TRADE AND MISCELLANEOUS NOTES

### Deaths

**Joseph L. R. Whetstone,** Philadelphia, Pa., died June 8 last, from a paralytic stroke. In 1878 Mr. Whetstone left Morris Taske & Company and formed the firm of Whetstone & Co. He remained president of this company till April, 1906, when poor health made it necessary for him to resign in favor of his son, Walter Whetstone. Mr. Whetstone was 54 years of age.

### Trade Literature

FOWLER AND WOLFE WALL RADIATORS (the original) vs. Pipe Coil Radiators is the subject of a timely and interesting booklet containing many facts regarding the relative efficiency of coils and the type of wall radiator made by the Fowler & Wolfe Manufacturing Co., Philadelphia, Pa. Illustrations accompany the reading matter, showing the course of the steam through both forms of radiation. Size 5x7¼ inches.

"BERNHARD BOILERS," a new catalog issued by the Garwood Foundry and Machine Co., Garwood, N. J., contains full information in regard to this interesting line of heaters, including many detail views with explanations of the use of the various parts. Pp. 20. Size 3½x6 inches. (Standard.)

"BUFFALO AIR WASHER AND HUMIDIFIER" is the title of a newly-issued catalog, published by the Buffalo Forge Co., Buffalo, N. Y., in which the subject of air washing and cooling is treated at length, and an account given of the conditions which led up to the need and development of an apparatus to accomplish this purpose. In addition to a number of half-tone views of the air washer itself, there are presented a table and chart showing the wide variations in the relative and absolute humidities under varying temperatures together with illustrations from plans in which the Buffalo air washer has been used in connection with heating and ventilating systems. Pp. 36. Size 6x9 inches. (Standard.)

"K-M-C" RADIATORS, including the Federal window pattern, are described in a recent circular issued by the Kellogg-Mackay-Cameron Co., Chicago, Ill. The Federal window pattern, it is stated, is made in all standard window heights for steam or water.

J-M COMBINATION FELT COVERINGS, as well as the asbestos Fire-Felt Covering, Asbestocel Covering for heating systems, Kearsarge Asbestos-Metallic Gaskets, and Tests and Practical Data on the Portland Sectional Conduits are illustrated and described in recent circulars issued by the H. W. Johns-Manville Co., New York. The J.-M. Combination Felt Covering has met with special success in mines and surfaces exposed to extreme weather conditions, having in several instances enabled steam to be carried considerably over a mile, even in cases where engineers considered it an impossibility. It has been found from experience, the company states, that the best results are obtained when this covering is applied by the manufacturers.

SEPARATORS for live and exhaust steam and oil. Pp. 12. Size 5½x9 inches. The John Davis Co., Chicago, Ill.

**The Albany Return Steam Traps**

have been the **STANDARD** for over **THIRTY-TWO YEARS.** For returning water under pressure to the boiler, they will perform this duty fully as well, and in many cases better than the so-called steam loop.

Send for circulars A, B, C and D.

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**ALBANY STEAM TRAP CO., ALBANY, N.Y.**

FREDERICK TOWNSEND, PRESIDENT — JAMES H. BLESSING, GEN. MGR.

BOILERS, The Boynton Furnace Co., New York. Catalog No. 80. Pp. 48. Size 5½x8 inches.

UNITED STATES RADIATOR CO., Dunkirk, N. Y. Catalog No. 506. Pp. 84. Size 4½x6¾ inches.

"THE CRAWFORD CADET," Walker & Pratt Mfg. Co., Boston, Mass. Description of a new boiler. Pp. 4. Size 6x9 inches (standard.)

### New Corporations

**Erie Heating Co.,** Chicago, Ill., has been incorporated, with a capital of $250,000. The directors are: F. A. Gale, G. N. Lyman and G. D. Bardon.

**Peter Cunneen & Co.,** New York, has been incorporated, to carry on a plumbing and heating business, with a capital of $25,000. The incorporators are: Peter Cunneen, Daniel Cunneen, James Haggerty, Alexander Magee and John Tynan.

**Kaufman-Haas Heating Co.,** Milwaukee, Wis., has been incorporated, with a capital of $5,000. The incorporators are: Frederick W. Kaufman, Leonard Haas and Emily D. Kaufman.

**Ravenna Furnace & Heating Co.,** Cincinnati, Ohio, has been incorporated, with a capital of $10,000. The incorporators are: Forest Firestone, A. V. Davidson, Dan J. Harris, C. B. Beard and L. E. Gardner.

**Ardmore Heat & Light Co.,** Muncie, Ind., has been incorporated, with a capital of $200,000. The directors are: John W. Smith, L. G. Neely, J. P. S. Neely, S. T. Murdock, E. R. Curtain, O. J. B. Kerr and E. J. Maire.

**Vapor Heating Co.,** York, Pa., has been incorporated, with a capital of $50,000. The incorporators are: Peter C. Wiest, Harry S. Wiest and Geo. S. Schmidt.

**Water Heater & Pacific Co.,** Oshkosh, Wis., has been incorporated with a capital of $25,000. The incorporators are: E. H. Steiger, Conrad Kieren and T. J. Schott.

**Utica Heating & Trading Co.,** Utica, N. Y., has been incorporated with a capital of $110,000. The directors are: J. J. Town, E. B. Odell and F. W. Owen.

**South Bend Heating & Plumbing Co.,** South Bend, Ind., has been incorporated with a capital of $10,000. The incorporators are: W. A. Duttera, William Hellmer and Harry B. Eager.

**Samuel Esswein Heating & Plumbing Co.,** Columbus, Ohio, has been incorporated with a capital of $200,000. The incorporators are: Samuel A. Esswein, O. J. Wheeler, Fred J. Trautman, Harry N. Heywood and Peter E. Esswein.

**American Heating Battery,** Arlington, N. J., has been incorporated with a capital of $500,000. The incorporators are:

We have opened for the accommodation of our friends an

EASTERN OFFICE AT

1135 Broadway, New York

HERBERT A. JOSLIN, Manager

Our TEMPERATURE REGULATING DEVICES

ARE THE MOST SIMPLE AND SENSITIVE
OF ANY ON THE MARKET

WRITE FOR CATALOGUE

THE NATIONAL REGULATOR CO.

W. W. CURTIS
President

334 Dearborn St., CHICAGO

Gustave K. Harting, George H. Fagan and A. M. Lynch.

**Steward Heating & Plumbing Co.,** Skowhegan, Me., has been incorporated with a capital of $50 000. The incorporators are: D. J. Greene, B. T. Steward, Philo Steward, D. C. Jewett and N. L. Steward.

**Kinney Heating & Supply Co.,** New York, has been incorporated with a capital of $5,000 to carry on a steam heating business. President, Charles B. Howard; treasurer, Thomas J. Kinney; clerk, Albert R. Gardner, all of Brookline, Mass.

**Franklin Car Heating Co.,** Syracuse, N. Y., has been incorporated to manufacture railway supplies, heaters, etc. Capital, $20,000. The incorporators are: G. H. Brown, W. L. Brown and K. D. Hequembourg.

### Manufacturers' Notes

**J. L. Mott Iron Works,** New York, closed its plant at 133d street and Third avenue, known as Mott Haven, June 9 last. During the past six months much of the machinery was moved to Trenton, N. J., where several hundred employees started working in the new plant. Now all the old machinery has been dismantled and taken to Trenton.

**American Radiator Co.,** Chicago, Ill., is building an extension to its Bond plant, in Buffalo, to cost about $12,000. The company is also putting up a six-story building in Omaha, Neb., which will cost about $60,000.

### Business Changes

**The Edison Illuminating Co.** and West Chester Steam Heat & Power Co., Philadelphia, Pa., have merged under one charter, with a capital stock of $70,000.

**The Consolidated Engineering Co.,** 42 West Jackson boulevard, Chicago, Ill., announce that Mr. Frank H. Chisholm has recently joined their forces as designing and erecting engineer.

**Mr. A. J. Vance,** who has recently taken up the Buffalo Forge Company's and the Buffalo Steam Pump Company's interests in Cincinnati, is located at 403 Neave Building in that city.

**Olaf Saugstad** has opened an office at 13-21 Park Row, New York, where he will practice as consulting and designing engineer, making a specialty of temperature and pressure regulation. Mr. Saugstad has been connected during the last three years with the Davis & Roesch Temperature Controlling Company and the H. & M. Automatic Regulator Company.


**An Insulation That Positively Deadens Sound**

"Keystone" Hair Insulator is so constructed that sound cannot penetrate it. Placed between the walls it keeps in the warmth and excludes the cold. Vermin proof. Inodorous. Inexpensive.

WRITE NEAREST BRANCH FOR BOOKLET

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Manufacturers of Asbestos and Magnesia Products, Asbestos Roofings, Packings, Electrical Insulating Materials, "Noark" Fuse Devices, Electric Railway Supplies, etc.

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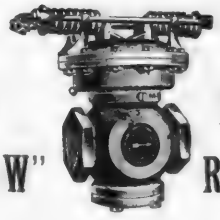
**The Foster "Class W" High Pressure Regulator**



will automatically maintain a fixed lower delivery pressure in spite of the variations delivered to it through the high pressure inlet.

This valve is very effective and above all, positively reliable.

For more details of the above and other Valve Specialties send for a Foster Catalog.

**Foster Engineering Co.**

NEWARK, N. J.

### Business Troubles

**Hull-Camp Co.,** 127-129 Worth street, New York, have had a petition in bankruptcy filed against them under date of June 26 last. Among the company's creditors are the Belknap Mfg. Co., for $600; Fee & Mason, $153, and M. T. Geraghty, $100. The assets are given as $7,000 and the liabilities as $15,000.

### Contracts Awarded

**Ideal Heating Co.,** Davenport, Iowa, heating and plumbing the new Merchant Club House.

**F. J. Butler,** Erie, Pa., steam heating the new O'Brien and Sullivan Hotel.

**Stack Bros.,** Superior, Wis., installing a heating plant in the Lincoln School. Their bid was $4,652.

**H. R. Lightcap,** Allegheny, Pa., steam heating the $12,000 residence of C. J. Andrews at Ben Avon.

**Eckert Bros. & Co.,** Akron, Ohio, installing the heating apparatus in the Findlay Building. The consideration was $2,400.

**Spriggs Bros.,** Grand Forks, N. D., heating and plumbing the Columbia Hotel.

**McGuinness-Smith Co.,** Pittsburg, Pa., heating the new bank and office building for the Humboldt Fire Insurance Company, Allegheny, Pa.

**Wilson-Wanless Co.,** Bay City, Mich., installing the heating system in the Garfield avenue school.

**Pond & Hasey Co.,** Minneapolis, Minn., heating the new Fourth Ward school building at Virginia, Minn. The contract price is $5,100.

**H. Ulrich,** Allegheny, Pa., steam heating the bank and office building of the Reiter-Fire-Stone Company at McKeesport, Pa.

**Moore Heating Co.,** Minneapolis, Minn., heating the Cotton building.

**Willey & Calhoun,** Portland, Me., heating and ventilating the new South Grammar School at Waterville.

**Mellott Heating Co.,** Pittsburg, Pa., heating eighteen houses for W. A. Stewart.

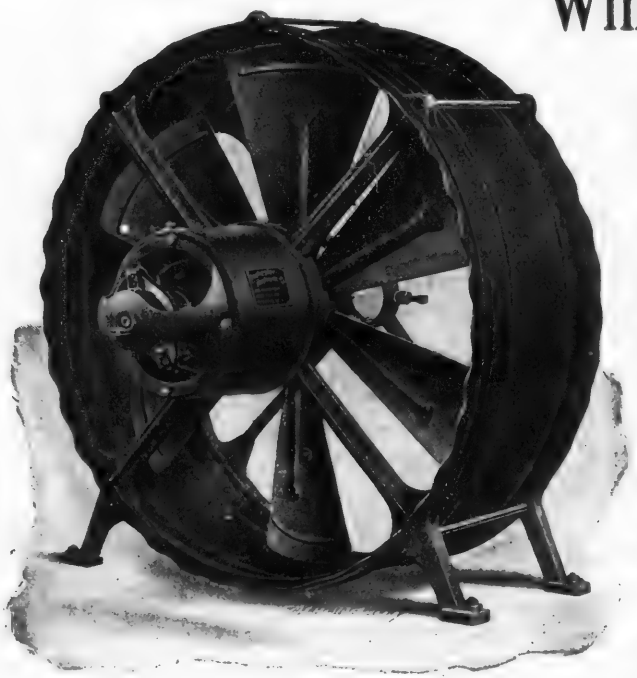
**Frederick Groenwold,** Napoleon, Ohio, heating and ventilating the main school, at $6,550; also heating, ventilating and plumbing the South Side building, at $1,285.

**J. Reilly, Jr.,** Bridgeport, Conn., hot water heating a residence on Congress street.

**Iron City Heating Co.,** Pittsburg, Pa., heating the Oakland Regular Baptist Church.

**M. Isbister,** Spokane, Wash., installing the heating apparatus in the courthouse.

**Oliver Schlemmer Co.,** Cincinnati, Ohio, installing new heating plant in the

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Third Intermediate School. The consideration was $18,300.

**Dwyer Plumbing & Heating Co.,** Chicago, Ill., heating and plumbing work for new mess halls and kitchen and two sets of officers' quarters at Fort Sheridan, Ill. Also conduit work connecting the different buildings at the fort with a general heating plant.

**A. P. Young,** Alma, Neb., heating and plumbing a school building, at their bid of $3,000.

**Bartlett & Kling,** Cedar Rapids, Iowa, heating the new administration building. The contract is worth $29,632.

**Wallace Supply Co.,** Spokane, Wash., heating and plumbing the Burke school. Contract price, $3,645.

**Campbell Heating Co.,** Kansas City, Mo., installing a heating plant in the new Baptist temple, at their bid of $1,600.

**McPherson & Son,** Portland, Ore., heating the new Lakeview school. The consideration was $3,400.

**L. R. Helbing & Co.,** Duluth, Minn., heating and ventilating the new Ely and Nettleton school buildings. Contract price, $16,640.

**S. B. Stewart,** New Orleans, La., installing exhaust fans and ventilating apparatus in the Marble Hall in the Custom House. Their bid was $1,500.

**Diamond Match Co.,** Barberton, Ohio, heating and ventilating a new school building.

**Laurium Hardware Co.,** Calumet, Mich., installing a new heating plant in the Irving building, in Newtown.

**Young & Hughes,** Raleigh, N. C., installing low-pressure steam heating plant in main building at the Methodist Orphanage.

**Tholen Brothers,** Leavenworth, Kan., heating a new building at the Boys' Industrial school in Topeka, Kan., at their bid of $1,629.

**William J. Bartlett,** Tacoma, Wash., heating the Wingate Hotel building, the consideration being $1,395.

**Pennsylvania Engineering Co.,** Philadelphia, Pa., installing new steam heating system and building a foundation in the Fagan school. The cost will be about $5,000.

**T. H. Ledden,** Ridgway, Pa., plumbing, heating and sewerage for the new Armour beef house at Punxsutawney.

**Thos. E. Hoye,** Milwaukee, Wis., heating the Beloit College, in Beloit, Wis. The work will cost $10,000.

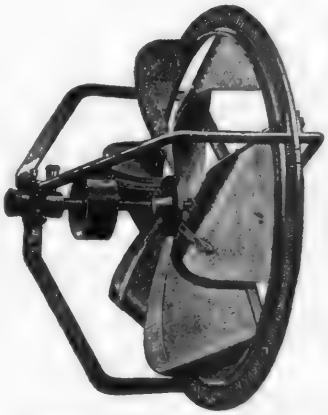
**Morrison Machinery Supply Co.,** Richmond, Va., installing heating apparatus in the second floor of the State Library building.

**Lewis & Kitchen,** Chicago, Ill., heating and ventilating the schoolhouse at Pontiac, Ill.

**L. W. Dukerschein Heating & Ventilating Co.,** Oshkosh, Wis., installing the heating in the new county poorhouse. The consideration is $8,429.

**Hankee & Eha,** St. Paul, Minn., heating the Longfellow school.

**J. R. Donnelly,** Austin, Tex., plumbing and heating the new $60,000 Wood Hall at the Southwestern University.

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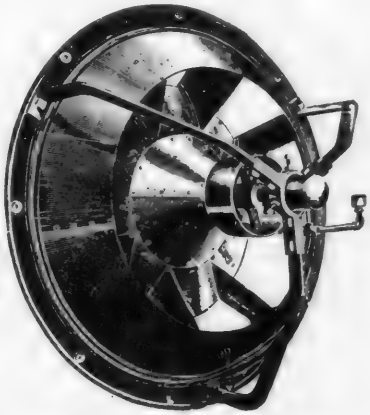

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**John Martin,** Austin, Tex., installing a new heating apparatus in the Hancock Opera House. The contract is worth $4,000.

**Allen, Myers & Co.,** Rock Island, Ill., installing steam heating, plumbing, gas fitting and automatic temperature-controlling apparatus in the People's National Bank.

**Campbell & Roebel,** Corapolis, Pa., plumbing and heating the new brewery at Alliquippa for the Mutual Brewing Company.

**Ward & McMahon,** Rock Island, Ill., installing a new steam heating system in St. Joseph's Catholic Church. Contract price, about $3,000.

**J. S. Cherne & Co.,** Duluth, Minn., heating and plumbing the new city hall. The consideration was about $2,227.

**B. G. Carpenter & Co.,** Wilkesbarre, Pa., heating, ventilating and sanitary arrangements for the Meade Street and Conyngham school buildings.

**McGuire Brothers,** Rockford, Ill., plumbing and heating the High School addition.

**English & Flett,** Boston, Mass., heating the Woburn and Hyde Park Exchange buildings.

**Smith & Anthony Co.,** Boston, Mass., heating and ventilating the Woodbridge School, at Oldtown.

**S. E. Ellis,** Bowling Green, Ky., plumbing, heating and gas fitting in the Potter-Matlock Bank and Trust Company's new building.

**E. H. Wallace,** Freeport, Pa., plumbing and heating the $18,000 store and lodge building for Mrs. John Irwin.

**T. P. Riley,** Fargo, N. D., heating and plumbing the new packing house of Armour & Company.

**Buffalo Forge Co.,** Buffalo, N. Y., heating and ventilating the new Elmwood avenue plant of the Geo. N. Pierce Company, where the Pierce 1907 cars will be built. The Buffalo Forge Company designed the original fan system installed over a quarter of a century ago, in the first works of the Pierce Company on Hanover street, which were partially destroyed by fire last winter.

**C. J. Fox,** Milwaukee, Wis., installing a central heating plant in the Twenty-second district school No. 2, at his bid of $5,175.

**Alex. Zeck & Son,** Wheeling, W. Va., heating the new natatorium now being built.

**Murphy & Hanley, Albany,** N. Y., installing the steam heating and power plant in the Burdick Tin Plate Factory; also hot water heating the County Clerk's residence on Fourth ave.


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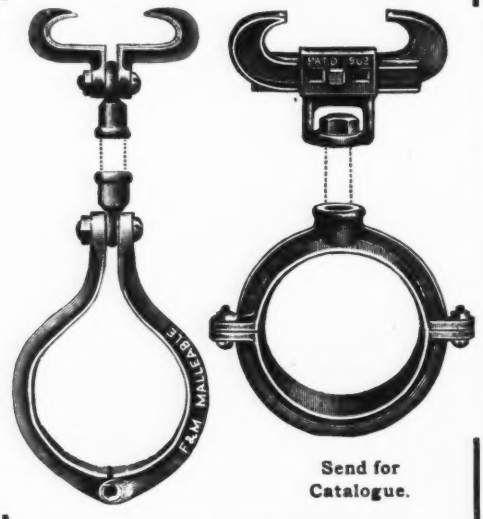


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**C. H. Maloney & Co.**, Elkhart, Ind., heating the schoolhouse at Bremen.

**John I. Dick,** Scottdale, Pa., heating and plumbing the new office building for H. C. Frick Coke Company.

**Tarentum Heating & Plumbing Co.,** Tarentum, Pa., heating and plumbing the new telephone building for the C. D. & P. Telephone Company at Oakmont; also James Mesler's residence.

**George McCullom,** Muskegon, Mich., heating the Northern Hotel at Grand Rapids. The contract is worth $5,000.

**Sutcliffe Ventilating & Drying Co.,** Ltd., Manchester, England, have the contract for warming and ventilating the new Enfield Cycle Factory for the Eadie Manufacturing Co., Ltd., at Redditch, England. The new works will have a floor area of 103,000 square feet and three large fans will supply over 3,000 cubic feet of fresh air, warmed or cooled as desired, per hour to each person employed, and for this purpose more than 3,000,000 cubic feet of air per hour will be delivered into the building. The works will be driven by three 100 H. P. gas engines and the heat from the exhaust will be used, as far as possible for raising the low pressure steam required for the heating plant.

**National System of Temperature Regulation** is being installed in the officers' building of the New York Edison Co., New York. The installation consists of 50 thermostats, controlling valves on 100 radiators. The National System is also being installed in the Ashland Street School, East Orange, N. J., and in the Burnet Street School, Newark, N. J., by the eastern office of the company. The National System has just been installed for regulating the temperature in connection with the Hygienic Hair Drying Apparatus in Atlantic City, N. J.


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### Eastern Trade Golf Association Tournament

An event that attracted many master steam fitters as well as representatives of the supply trade to the Atlantic City Convention was the meet of the Eastern Trade Golf Association on June 20. Twenty-seven players took part in the competition, which was held on the links of the Atlantic City Country Club under perfect weather conditions. Two rounds were played, the morning round determining the class to which the player was allotted in the afternoon. In addition to prizes in each of four classes, the trophies included a captain's cup, presented by Captain Fred W. Schultz, of *The Metal Worker;* the Championship cup, presented last year by Frank C. McLain, of Canton, Ohio, to be won three times for permanent possession; a visitor's cup, presented by E. H. Roberts, of the Standard Steam Specialty Company, of New York.

Frank C. Jennings, of Bruce & Cook, scored a first win on the championship cup, with a total score for the thirty-six holes of 172. Frank B. Barrett, of New York, has also won a leg on this cup. Mr. Jennings also won the captain's cup for the best afternoon score, 85, and a third cup for the best score in the first class. The visitor's cup, presented by Mr. Roberts, was won by C. N. Brisze, of Baker, Smith & Company, New York, who had 95. The other winners were: A. E. Barron, Kenny Mfg. Co., New York, runner-up in the first class; second class, M. E. Danforth, winner, W. C. Marsh, runner-up; third class, H. S. Martin, winner, E. H. Roberts, runner-up; fourth class, E. F. Glore, winner, T. M. Dobbins, runner-up. The runner-up prizes in each of these classes were porcelain cups presented by Thomas Maddock's Sons Co., Trenton, N. J. Following the afternoon play, an approaching and putting contest was won by W. C. Marsh with a score of 9, for which a special cup was provided. Each contestant played three balls, one each from distances of 30, 60 and 90 yards from the hole. The score represented the total number of strokes required to hole out all three balls.

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